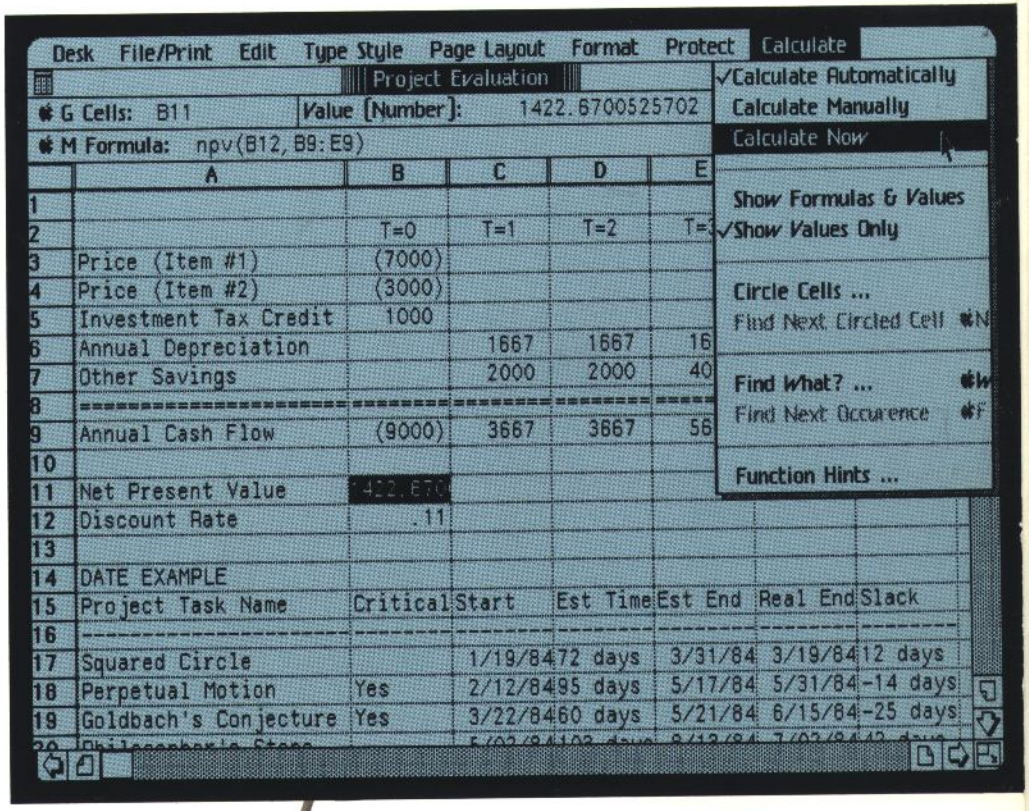
LisaCalc


Desk File/Print Edit Type Style Page Layout Format Protect Calculate
Project Evaluation
G Cells: B11
Value [Number]: 1422.6700525702
M Formula: npv(B12,B9:E9)
✓Calculate Automatically
Calculate Manually
Calculate Now
Show Formulas & Values
✓Show Values Only
Circle Cells ...
Find Next Circled Cell
Find What? ...
Find Next Occurence
Function Hints ...
A B C D E
1
2 T=0 T=1 T=2
3 Price (Item #1) (7000)
4 Price (Item #2) (3000)
5 Investment Tax Credit 1000
6 Annual Depreciation 1667 1667
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8
9 Annual Cash Flow (9000) 3667 3667
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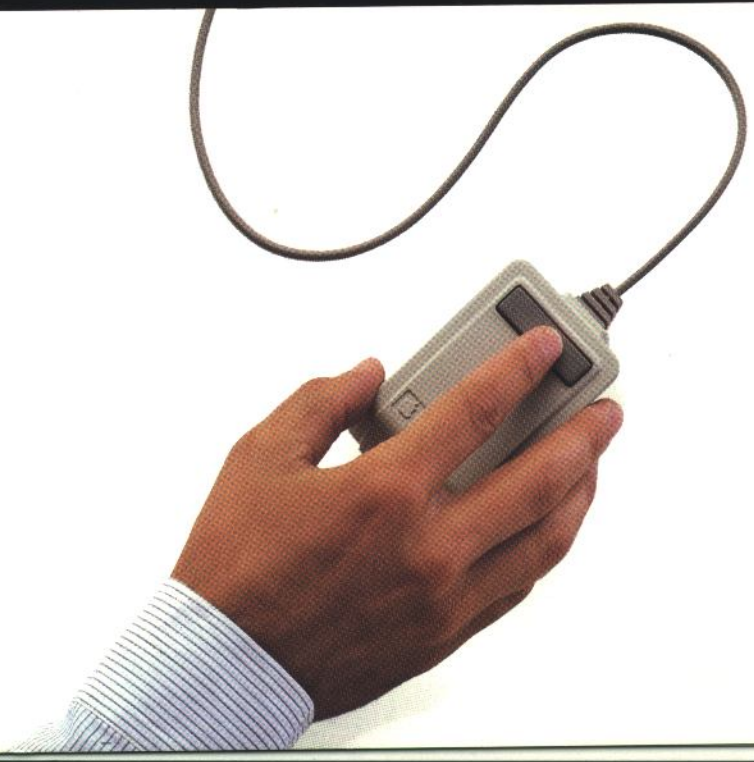
11 Net Present Value
12 Discount Rate .11
13
14 DATE EXAMPLE
15 Project Task Name Critical Start Est Time Est End Real End Slack
16
17 Squared Circle 1/19/84 72 days 3/31/84 3/19/84 12 days
18 Perpetual Motion Yes 2/12/84 95 days 5/17/84 5/31/84 -14 days
19 Goldbach's Conjecture Yes 3/22/84 60 days 5/21/84 6/15/84 -25 days



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LisaCalc

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Introducing LisaCalc

LisaCalc is an electronic spreadsheet — a grid of columns and rows into which you enter information, such as numbers and formulas, to perform calculations. The calculating capabilities of LisaCalc allow you to keep financial and other types of reports, like budgets, sales figures, expense records, or financial statements.

LisaCalc can perform simple arithmetic such as adding a column of expenses, or complex statistical analysis such as projecting ahead on historical data.

Once you've entered information to create a spreadsheet, LisaCalc can help you make decisions by modeling possible courses of action. What if you decrease a retail price and sales increase? What if you increase expenses? Is it more economical to lease or buy that new piece of equipment? What about expanding?

You can also use LisaCalc to analyze your stock purchases, figure investment yields, or calculate income tax.

At any time you can make changes to the content or visual appearance of the spreadsheet. You can make a printed copy of your spreadsheet in a variety of styles to best suit a particular need, whether it be record keeping, analysis, or presentation.

About This Manual

This manual contains three chapters.

- Chapter 1, Learning LisaCalc, introduces you to LisaCalc and gives you practice using it by taking you step-by-step through an easy example.
- Chapter 2, Using LisaCalc, contains detailed instructions for performing specific tasks with LisaCalc and offers suggestions that help you use LisaCalc efficiently and effectively.
- Chapter 3, LisaCalc Reference, provides a summary of the LisaCalc menus, as well as complete information on LisaCalc constants, formulas, and functions.

Each chapter begins with its own table of contents so you can easily look up different topics. If you can't find what you need in the table of contents, check the Index at the end of the manual. The Index lists many topics in several ways to help you find the topic you're looking for even if you're not sure what it's called.

The information in this manual assumes you've gone through LisaGuide, which teaches you how to use the mouse and explains special terms, such as *selecting* and *choosing*. For instructions on starting LisaGuide, refer to the *Lisa Office System* manual.

Chapter 1

Learning LisaCalc

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Getting Started with LisaCalc

This chapter gives you actual practice in using LisaCalc. By going step by step through an easy example, you will quickly become familiar with the basic skills for using LisaCalc to create, revise, save, and print your own documents.

Have You Gone through LisaGuide?

The Lisa Office System comes with a micro diskette called LisaGuide, which provides a self-paced tutorial on use of the Lisa desktop and the mouse. Before beginning the practice exercises given here, be sure you've gone through LisaGuide.

You should now feel comfortable with the special terms used in reference to the Lisa®. For example, do you fully understand the special processes called *selecting* and *choosing?* If not, now is a good time to review LisaGuide once more. Refer to Chapter 1, LisaGuide, in the *Lisa Office System* manual for instructions on starting the LisaGuide micro diskette.

What You Need to Get Started

To do the practice exercises in this chapter, you'll need

- A Lisa set up and plugged in , with the keyboard and mouse attached. Make sure the Lisa is turned on.
- A printer set up and plugged in if you want to print your practice documents. Make sure your printer is hooked up to the Lisa and turned on. Printing is optional.
- About 30 minutes.

If your system is not already set up, refer to Appendix A, Setup Procedures, in the *Lisa 2 Owner's Guide.*

Seeing What's on a Disk

To get at the LisaCalc examples you'll work with, you first need to open the Disk icon as described in the steps below. The way you'll open the Disk icon illustrates your Lisa's most general principle:

- First you select something.
- Then you do something to what you've selected.

To Open the Disk Icon:

1 ▶ Select (highlight) the Disk icon by placing the tip of the pointer on the icon and clicking the mouse button, as shown. (Icon not highlighted? Try again.)

Click on disk to select

▶▶▶

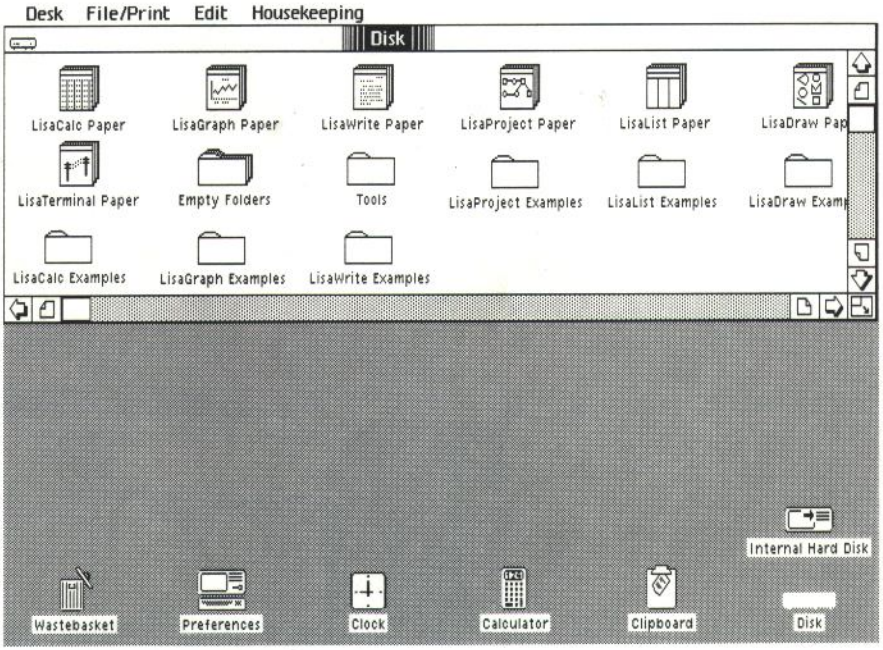
2 ▸ To open the selected Disk icon, open the **File/Print** menu and choose **Open "Disk"**.

a. Press and hold down the mouse button, with the pointer's tip on **File/Print** in the menu bar.

b. Move the pointer down and release when **Open "Disk"** is highlighted. (Is the Open menu item dim? You probably clicked somewhere else on the gray part of the screen and deselected the Disk icon. Go back to step 1 and make sure the Disk icon is selected.)

Note: When a menu item is dim, you can't choose it

3 ▸ Notice the window to the disk that zooms open on your Lisa's desktop. Your disk is like a very large file drawer; it's where you'll keep most of your work.



Pulling a Document

Inside the disk window you should see several stationery pads and folders. The LisaCalc examples folder contains the example you'll be working on here. In the steps below, you will

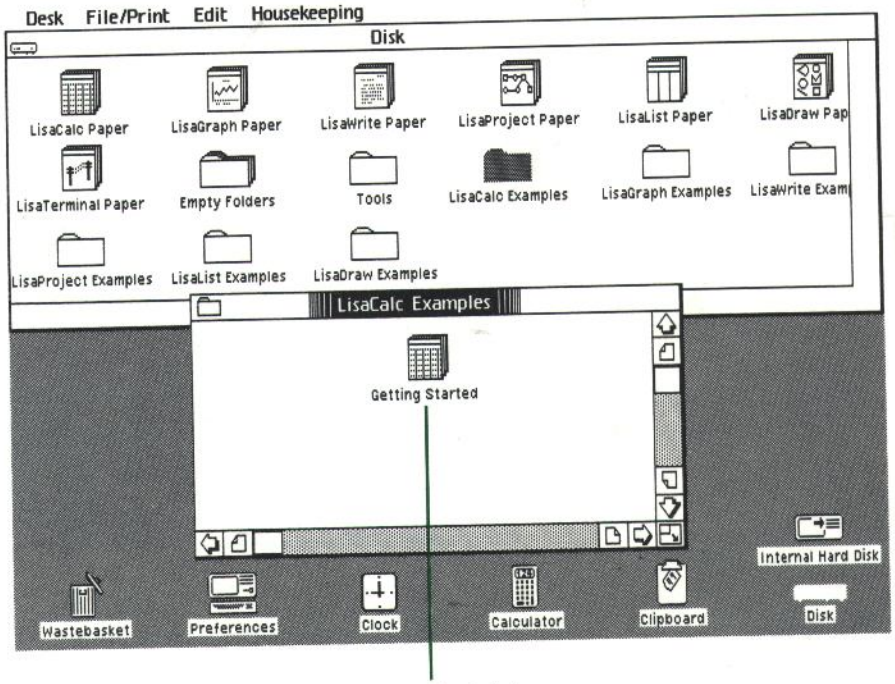
- Open the LisaCalc Examples folder.
- Tear off a sheet from the Getting Started stationery pad that's inside the folder.
- Move the new sheet, or document, to a clear spot in the folder.
- Give the new document the name *Sales Forecast.*
- Open the document.

To Open the LisaCalc Examples Folder:

1 ▶ Select the LisaCalc Examples folder by clicking on it.

2 ▶ Open the **File/Print** menu and choose **Open "LisaCalc Examples"**.

Notice the window to the LisaCalc Examples folder that zooms open, and its contents, as shown. The *spreadsheet* patterns on the icons in the folder show they are LisaCalc icons.



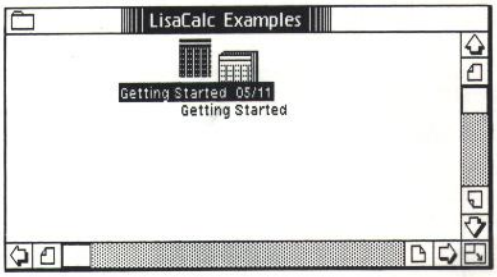
LisaCalc icon

Copies of the Getting Started example are on the Getting Started stationery pad.

To Tear off a Sheet from the Pad:

1 ▸ Select the Getting Started pad icon.

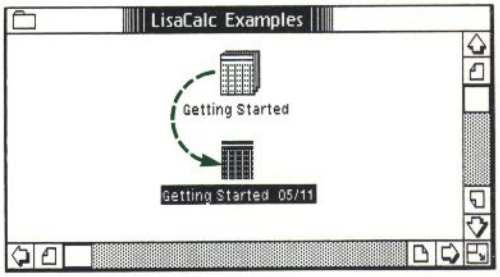
2 ▸ Open the **File/Print** menu and choose **Tear Off Stationery**. Wait a moment until the new document appears, as shown.



To Move the New Icon out of the Way, to a Clear Spot in the Folder:

1 ▸ Place the pointer on the icon.

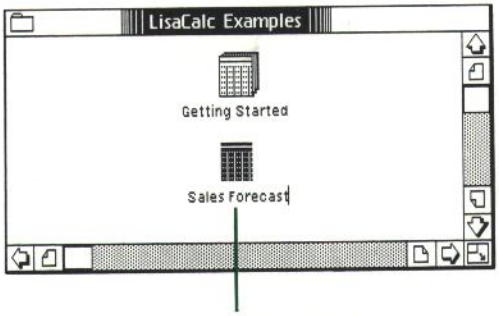
2 ▸ Press and hold down the mouse button and move the icon as shown; then release the mouse button.



To Rename the New Document:

1 ▶ Make sure the new document icon is still selected (highlighted). If you've deselected the icon by clicking elsewhere on the screen, select it again by clicking on it.

2 ▶ Type the name *Sales Forecast.* (Typing mistake? Use the Backspace key to correct it.)



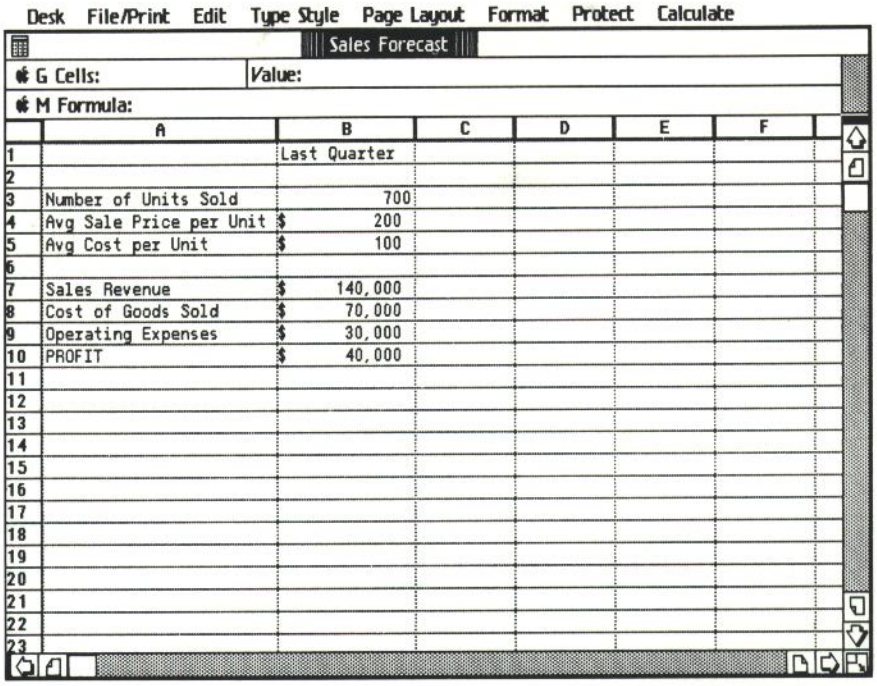
Type *Sales Forecast*

To Open the Sales Forecast Document:

1 ▶ Make sure the document icon is selected (highlighted).

2 ▶ Open the **File/Print** menu and choose **Open "Sales Forecast"**.

Notice how the icon zooms open into a window. Wait a minute — the hourglass, ⌛, means wait — until the LisaCalc tool displays the Sales Forecast document, as shown.



The LisaCalc Document

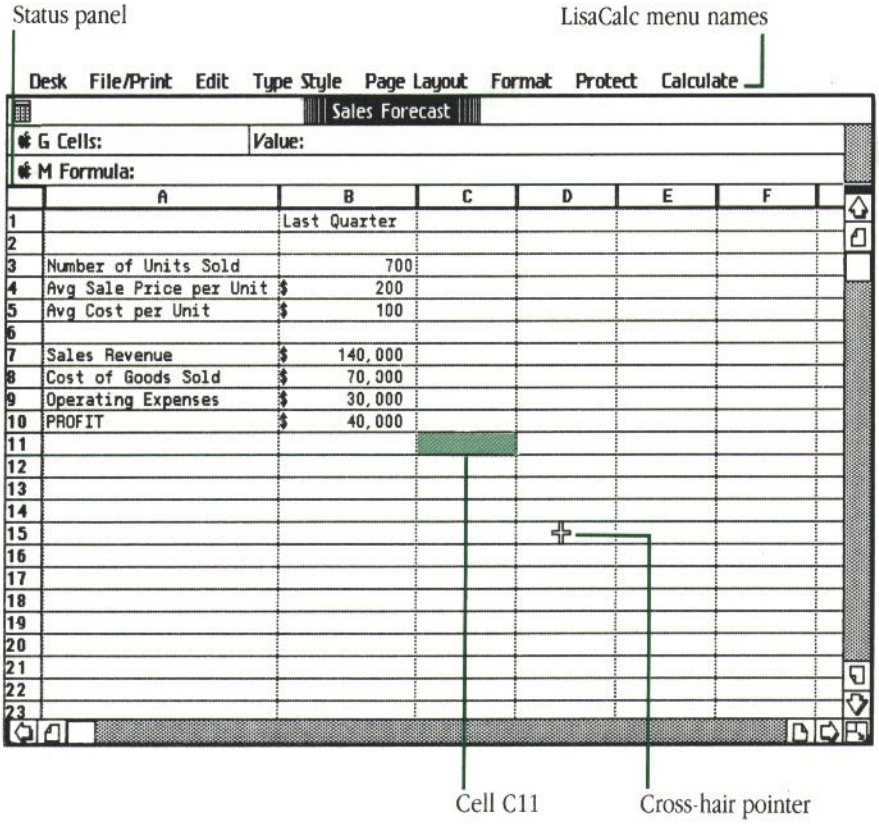
The Sales Forecast document is now open on your Lisa's desktop.

Across the menu bar at the top of the screen are the LisaCalc *menu names.* Each menu contains a list of actions you can take with a LisaCalc document.

The LisaCalc spreadsheet is composed of *lettered columns* and *numbered rows* that intersect to form the cells into which you enter information. For example, cell C11 is in column C, row 11.

The *Status panel,* above the spreadsheet, contains areas labeled Cells, Value, and Formula. These display a selected cell's coordinates (column and row location), value, and formula.

Without pressing the mouse button, move the pointer around the screen and notice how the shape of the pointer changes to an *arrow pointer,* , when it's over the menu bar; to a *text pointer,* , when it's over the Cells section of the Status panel; and to a *cross-hair pointer,* , when it's over the spreadsheet.



	A	B	C	D	E	F
1		Last Quarter				
2						
3	Number of Units Sold	700				
4	Avg Sale Price per Unit	$ 200				
5	Avg Cost per Unit	$ 100				
6						
7	Sales Revenue	$ 140,000				
8	Cost of Goods Sold	$ 70,000				
9	Operating Expenses	$ 30,000				
10	PROFIT	$ 40,000				
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						

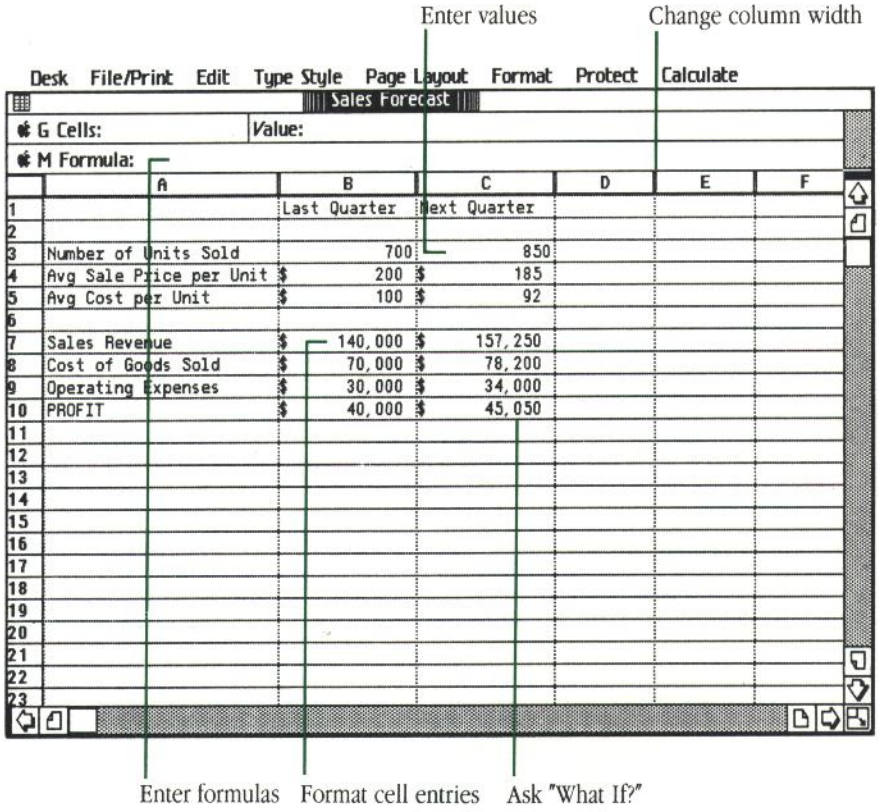
Practice with LisaCalc

Imagine you work for a fictional company called Switch-On Communications, Inc. One of your competitors has recently introduced a business phone similar to one you produce, but is selling it at a price lower than yours. To remain competitive, you are planning to lower the price of your phone. You are now preparing next quarter's sales forecast, and you want to see how many lower-priced phones you will need to sell to meet your profit objectives.

In the next several pages you will learn to

- Enter values into cells.
- Format cell entries so the numbers appear as dollar amounts.
- Enter formulas so calculations are performed automatically.
- Ask *What If?* by changing values and evaluating changed results.
- Change the width of a column so your new column heading will fit.

When you've finished, your spreadsheet will look like the one below. Compare it with the spreadsheet now on your screen.



Entering Values

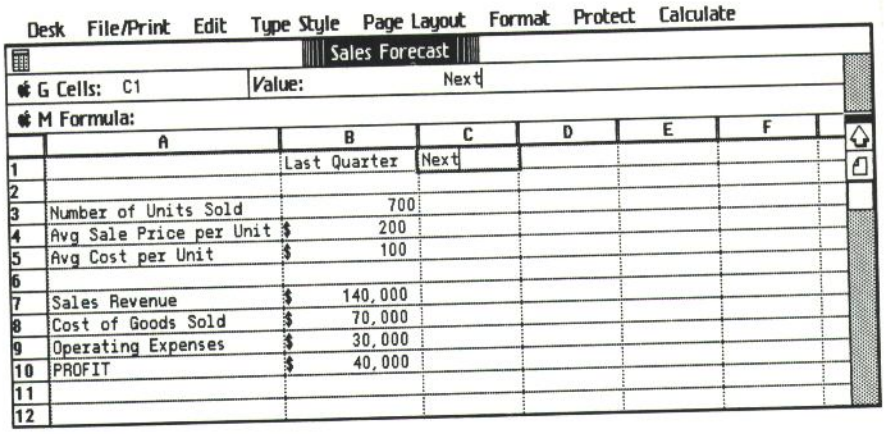
Following the steps below, you will enter the values for next quarter's forecast into column C. You'll begin with the assumption that next quarter you'll sell the same number of units at the same price as last quarter. You predict, however, that your operating expenses for next quarter will increase.

To Enter Values:

1 ▶ Enter the word *Next,* for Next Quarter, into cell C1.

a. Select cell C1 by placing the pointer in the cell and clicking the mouse button once. (Select the wrong cell? Move the pointer to the cell you want and click.)

b. Type *Next* and press Enter . (Make a mistake? Use the Backspace key or open the **Edit** menu and choose **Clear Entries.**)



Follow the same procedure to enter the number values into their appropriate cells.

2 ▶ Enter *700* into cell C3. (Don't forget to press the Enter key.)

3 ▶ Enter *200* into cell C4. (Don't worry about dollar signs yet.)

4 ▶ Enter *100* into cell C5.

5 ▸ Enter *34000* into cell C9.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Sales Forecast

G Cells: C9 | Value: 34000

M Formula:

	A	B	C	D	E	F
1		Last Quarter	Next			
2						
3	Number of Units Sold	700	700			
4	Avg Sale Price per Unit	$ 200	200			
5	Avg Cost per Unit	$ 100	100			
6						
7	Sales Revenue	$ 140,000				
8	Cost of Goods Sold	$ 70,000				
9	Operating Expenses	$ 30,000	34000			
10	PROFIT	$ 40,000				
11						
12						

Formatting Cell Entries

All the figures you are dealing with are dollar amounts except for the number of units sold. Follow the steps below to change the format of cells C4 through C10 so that their entries will be displayed as dollar amounts.

To Format Cell Entries:

1 ▸ Select the cell range from C4 to C10, as shown.

a. Place the pointer in cell C4.

b. Press and hold down the mouse button, move the pointer down to cell C10, then release. (Select the wrong range? Move the pointer to cell C4 and begin again.)

Press here

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Sales Forecast

G Cells: C4:C10 | Value:

M Formula:

	A	B	C	D	E	F
1		Last Quarter	Next			
2						
3	Number of Units Sold	700	700			
4	Avg Sale Price per Unit	$ 200	200			
5	Avg Cost per Unit	$ 100	100			
6						
7	Sales Revenue	$ 140,000				
8	Cost of Goods Sold	$ 70,000				
9	Operating Expenses	$ 30,000	34000			
10	PROFIT	$ 40,000				
11						
12						

Release here

▸▸▸

2 ▸ Open the Format menu and choose *$1,235*. (Choose the wrong menu item? Go back and choose the one you want.)

Notice how the values you've already entered now appear as dollar amounts. Entries into the remaining formatted cells will also appear as dollar amounts.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Sales Forecast

G Cells: C4:C10 Value:

M Formula:

	A	B	C	D	E	F
1		Last Quarter	Next			
2						
3	Number of Units Sold	700	700			
4	Avg Sale Price per Unit	$ 200	$ 200			
5	Avg Cost per Unit	$ 100	$ 100			
6						
7	Sales Revenue	$ 140,000				
8	Cost of Goods Sold	$ 70,000				
9	Operating Expenses	$ 30,000	$ 34,000			
10	PROFIT	$ 40,000				
11						
12						

Entering Formulas

You next want to calculate sales revenue. Enter the formula: Sales Revenue = Number of Units Sold E Avg Sale Price per Unit. The formula for that is:

C3*C4

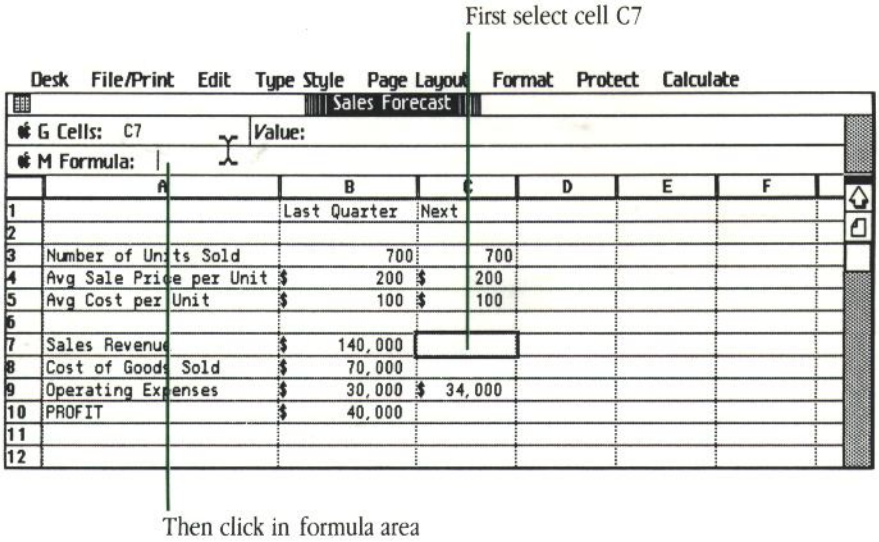
You want the calculated result of formula C3*C4 to appear in cell C7, Sales Revenue. Then you want to calculate the Cost of Goods Sold and the Profit.

To Enter a Formula:

To enter a formula, you follow a different procedure than you do to enter a value. First, you select the cell that is to contain the formula's calculated result. Then you enter the formula into the Status panel, as described below.

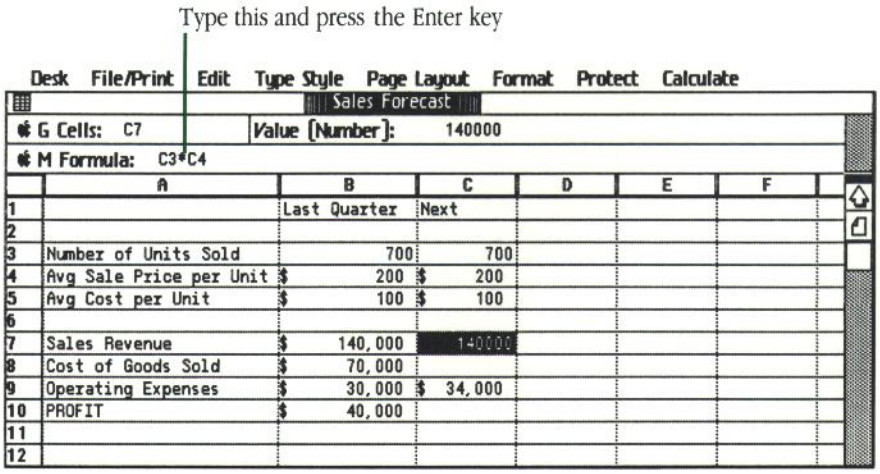
1 ▸ Select cell C7.

2 ▶ **Important**: You always enter a formula via the Status panel. Select an insertion point in the Formula area of the Status panel by clicking once after the word *Formula.*



3 ▶ Is there a blinking insertion point after the word *Formula?* If not, repeat step 2. If so, type *C3*C4.* (Make a mistake? Use the Backspace key.) When entry is correct, press the Enter key.

Notice the calculated result for Sales Revenue that appears in cell C7.



▶▶▶

Follow the procedure in steps 1 through 3 to enter the following formulas:

4 ▶ Enter the formula for Cost of Goods Sold, *C3*C5,* so the calculated result appears in cell C8. (Make a mistake? Use the Backspace key or open the **Edit** menu and choose **Clear Entries**; be sure to enter the formula via the Status panel.)

5 ▶ Enter the formula for Profit, *C7 − C8 − C9,* so the calculated result appears in cell C10.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Sales Forecast

G Cells: C10 | Value [Number]: 36000

M Formula: C7-C8-C9

	A	B	C	D	E	F
1		Last Quarter	Next			
2						
3	Number of Units Sold	700	700			
4	Avg Sale Price per Unit	$ 200	$ 200			
5	Avg Cost per Unit	$ 100	$ 100			
6						
7	Sales Revenue	$ 140,000	$ 140,000			
8	Cost of Goods Sold	$ 70,000	$ 70,000			
9	Operating Expenses	$ 30,000	$ 34,000			
10	PROFIT	$ 40,000	36000			
11						
12						

"What If?": Changing Values and Evaluating Changed Results

Your competition is now selling a phone similar to your Switch-On Exec phone for $180. Although your phone has a couple of features that the competition's doesn't, you are considering lowering the selling price of the Switch-On Exec from $200 to $185 to remain competitive.

You have set a $45,000 profit goal for next quarter and want to know how many phones you would have to sell to reach that goal. Follow the steps below to evaluate some of the sales options available to you.

To Make and Evaluate Projected Changes:

1 ▶ Enter *185* into cell C4. (Select the cell, type *185,* and press Enter.)

Notice how your projected Sales Revenue and Profit figures automatically recalculate — and show you far below your profit goal of $45,000.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Sales Forecast

G Cells: C4 | Value (Number): 185

M Formula:

	A	B	C	D	E	F
1		Last Quarter	Next			
2						
3	Number of Units Sold	700	700			
4	Avg Sale Price per Unit	$ 200	185			
5	Avg Cost per Unit	$ 100	$ 100			
6						
7	Sales Revenue	$ 140,000	$ 129,500			
8	Cost of Goods Sold	$ 70,000	$ 70,000			
9	Operating Expenses	$ 30,000	$ 34,000			
10	PROFIT	$ 40,000	$ 25,500			
11						
12						

2 ▶ Enter *800* into cell C3 to represent an increase in unit sales.

3 ▶ As you produce more phones, the amount under Avg Cost per Unit will decrease. So, enter *92* into cell C5.

Notice that if you sell 800 phones for $185 each, even with a decreased unit cost, you still won't reach your profit goal of $45,000.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Sales Forecast

G Cells: C5 | Value (Number): 92

M Formula:

	A	B	C	D	E	F
1		Last Quarter	Next			
2						
3	Number of Units Sold	700	800			
4	Avg Sale Price per Unit	$ 200	$ 185			
5	Avg Cost per Unit	$ 100	92			
6						
7	Sales Revenue	$ 140,000	$ 148,000			
8	Cost of Goods Sold	$ 70,000	$ 73,600			
9	Operating Expenses	$ 30,000	$ 34,000			
10	PROFIT	$ 40,000	$ 40,400			
11						
12						

▶▶▶

4 ▶ Now enter *850* into cell C3.

Notice that you will reach your profit goal of $45,000 if you sell 850 phones at $185 each.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Sales Forecast

G Cells: C3 | Value [Number]: 850

M Formula:

	A	B	C	D	E	F
1		Last Quarter	Next			
2						
3	Number of Units Sold	700	850			
4	Avg Sale Price per Unit	$ 200	$ 185			
5	Avg Cost per Unit	$ 100	$ 92			
6						
7	Sales Revenue	$ 140,000	$ 157,250			
8	Cost of Goods Sold	$ 70,000	$ 78,200			
9	Operating Expenses	$ 30,000	$ 34,000			
10	PROFIT	$ 40,000	$ 45,050			
11						
12						

Profit goal reached

Changing the Width of a Column

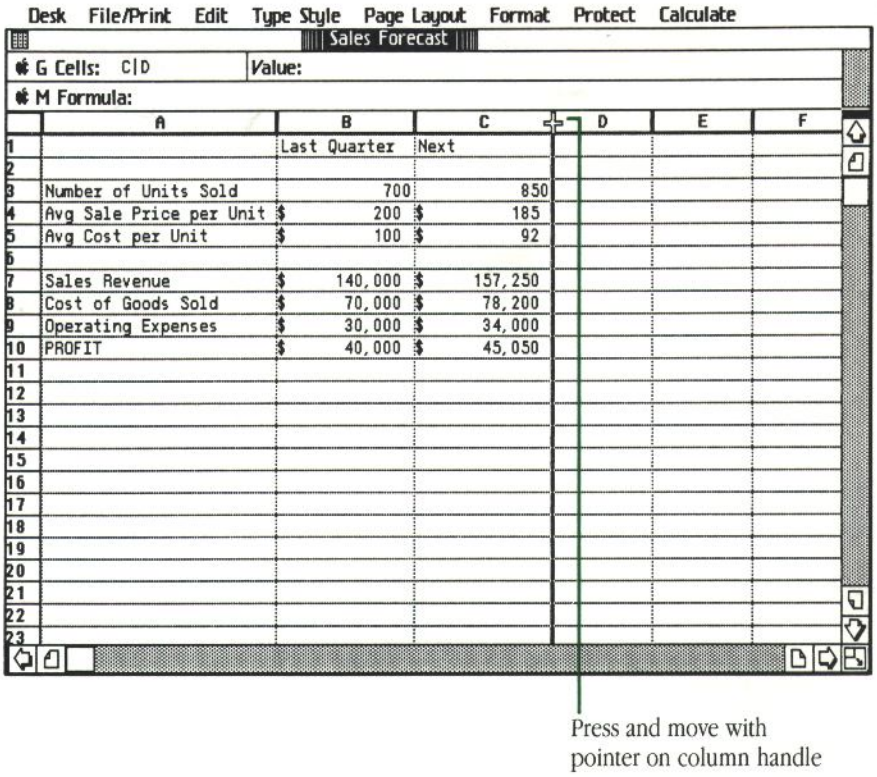
You now want to prepare your Sales Forecast spreadsheet for distribution. Follow the steps below to widen column C and then add to the column heading so that it reads *Next Quarter.*

To Change the Width of One Column:

1 ▶ The C/D column handle is the line between the letters C and D at the top of the spreadsheet. Move the cross-hair pointer to the C/D column handle.

2 ▶ Press and hold down the mouse button as you move the pointer to the right, just before the letter *D*; then release.

Notice that column C is now widened.



	A	B	C	D	E	F
1		Last Quarter	Next			
2						
3	Number of Units Sold	700	850			
4	Avg Sale Price per Unit	$ 200	$ 185			
5	Avg Cost per Unit	$ 100	$ 92			
6						
7	Sales Revenue	$ 140,000	$ 157,250			
8	Cost of Goods Sold	$ 70,000	$ 78,200			
9	Operating Expenses	$ 30,000	$ 34,000			
10	PROFIT	$ 40,000	$ 45,050			
11						
12						
13						
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20						
21						
22						
23						

3 ▶ Insert the word *Quarter* in the column heading (cell C1) so that the heading reads *Next Quarter.*

a. Click once to select cell C1.

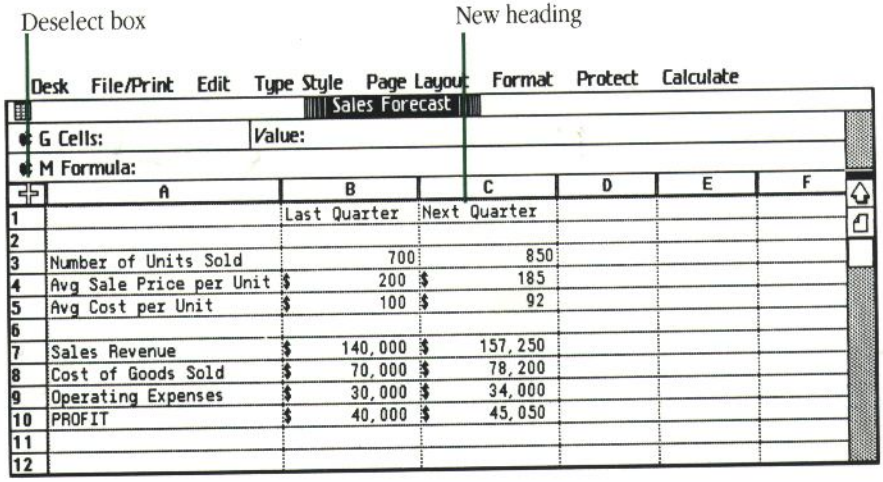
b. Click again after the word *Next* to select an insertion point.

c. Press the space bar and type *Quarter.*

d. Press the Enter key.

▶▶▶

Your spreadsheet is now complete. To see it without any cell selected, click in the deselect box, as shown.



	A	B	C	D	E	F
1		Last Quarter	Next Quarter			
2						
3	Number of Units Sold	700	850			
4	Avg Sale Price per Unit	$ 200	$ 185			
5	Avg Cost per Unit	$ 100	$ 92			
6						
7	Sales Revenue	$ 140,000	$ 157,250			
8	Cost of Goods Sold	$ 70,000	$ 78,200			
9	Operating Expenses	$ 30,000	$ 34,000			
10	PROFIT	$ 40,000	$ 45,050			
11						
12						

Printing Your Document

You can now print the LisaCalc chart you've been working on if you want to. For guidelines on printing, refer to Printing your Document, in Chapter 3 of the *Lisa Office System* manual.

If you don't want to print your chart now, or if no printer is available, go on to the next section, Putting Your Document Away.

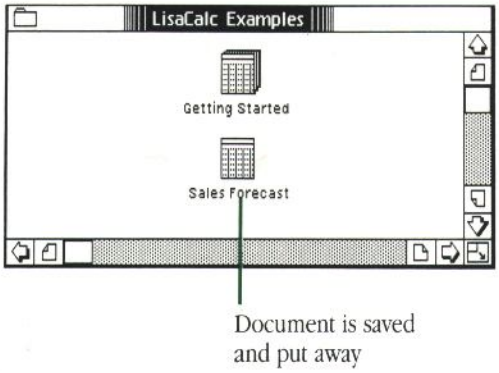
Putting Your Document Away

Now that you've finished working on your document, follow the steps below to put it away. Even if you chose to print your document and it's still printing, you can put this document away and continue to use your Lisa to do other work.

To Put a Document Away:

1 ▶ Open the **File/Print** menu and choose **Save & Put Away**. (Is the **Save & Put Away** menu item dim? If so, you need to click in the document to activate the window.)

Notice how the window zooms down to a document icon back in its filing home in the LisaCalc Examples folder.

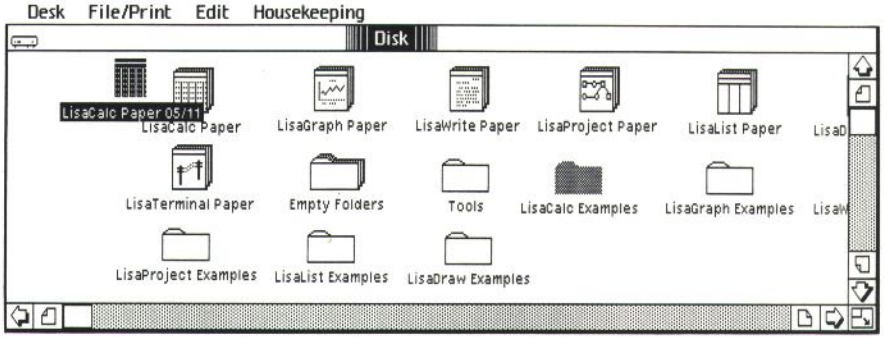


Starting from Scratch

To start a new spreadsheet, you need to get a piece of LisaCalc stationery, as described below. Blank LisaCalc stationery is in a pad called LisaCalc Paper, in the disk window.

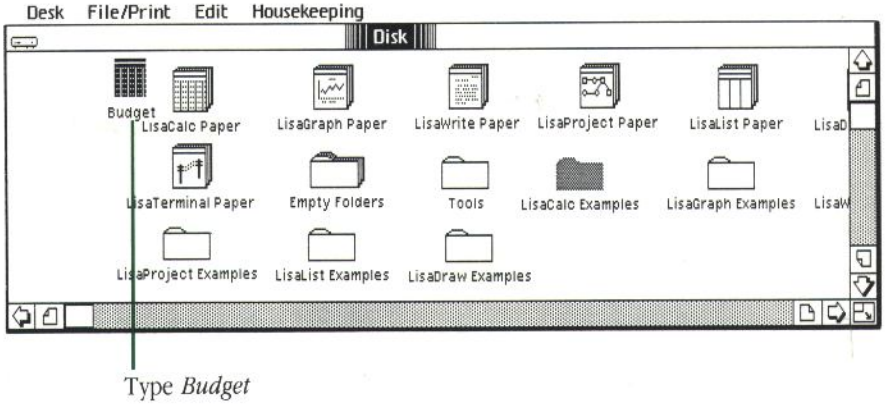
To Start a New Spreadsheet:

1 ▶ Tear off a sheet from the LisaCalc Paper pad at the top of the disk window. (Select the pad icon, open the **File/Print** menu, and choose **Tear Off Stationery**.)



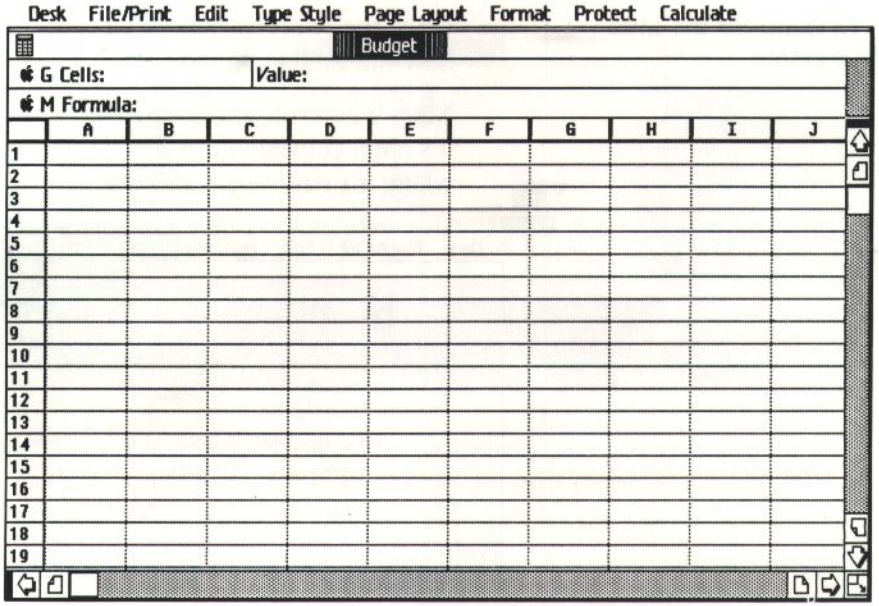
▶▶▶

2 ▸ Don't worry right now about moving the new document out of the way. Change its name to *Budget.* (Make sure the icon is selected, then type.)



3 ▸ Open the piece of LisaCalc paper you named Budget as you would any document. (Open the **File/Print** menu and choose **Open "Budget"**.)

4 ▶ If you want to make your own spreadsheet, do so. Experiment — try different things. Press the mouse button and move across the menu bar and look at what's in all your menus. If you want specific information on something, look in Chapter 3, LisaCalc Reference Guide, or check the index.



Finishing Up

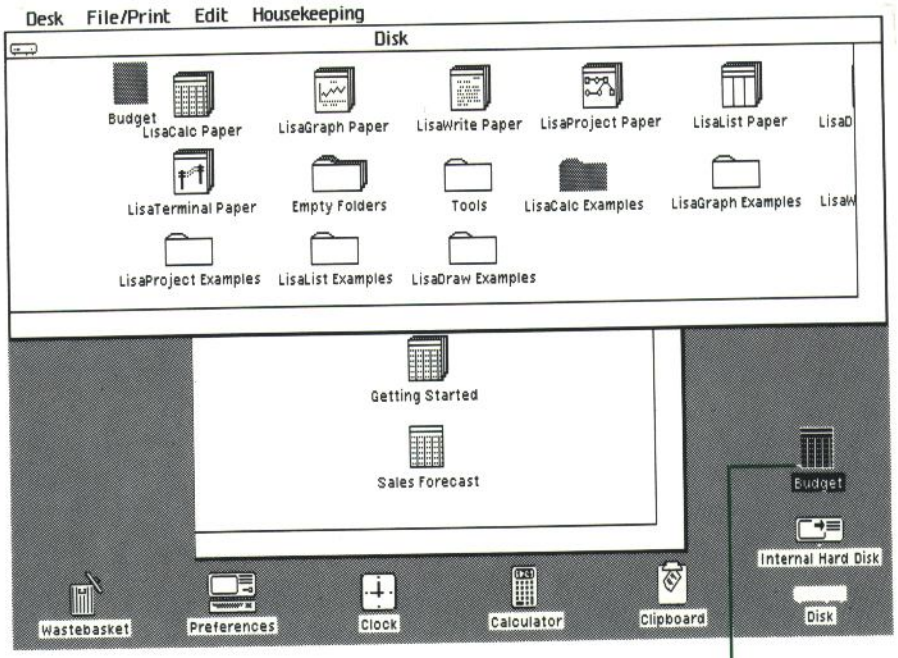
It is a good idea to save all your documents and clear off your Lisa's desktop at least once a day. The steps below illustrate one of the many ways you can manage things on the Lisa desktop.

Note: When you are connecting, disconnecting, moving, or servicing equipment, you must turn off the power and unplug the Lisa.

To Clear off the Lisa Desktop:

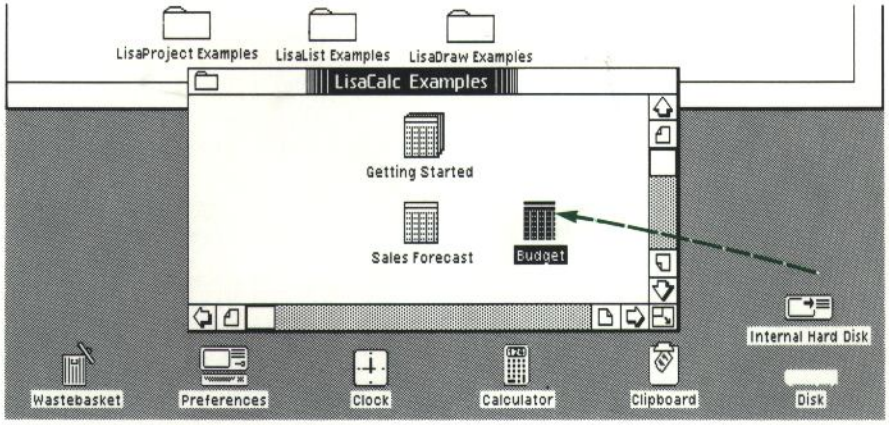
1 ▶ Open the **File/Print** menu and choose **Set Aside "Budget"**. Notice how the Budget window is set aside as an icon on the desktop.

Note: When you're working with several documents at the same time, it's often convenient to keep some of them set aside on the desktop, where it's easy to get at them.



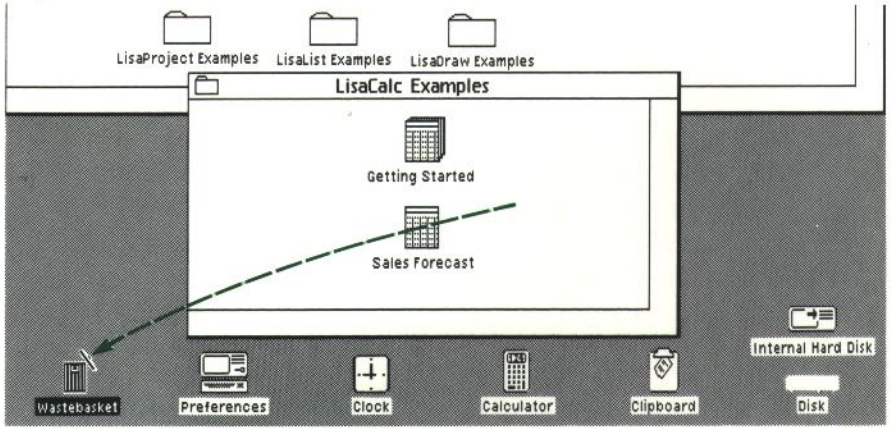
Budget is set aside

2 ▶ If you want to file the Budget document in a new place, move it to a clear area in the LisaCalc Examples folder, as shown. (Press the mouse button with the pointer on the icon, move the icon, and release when the icon is where you want it.)



3 ▶ If you want to throw away the Budget document, move it to the Wastebasket icon. When the document icon is on the Wastebasket and the Wastebasket icon highlights, release the mouse button and wait for the document to be deposited.

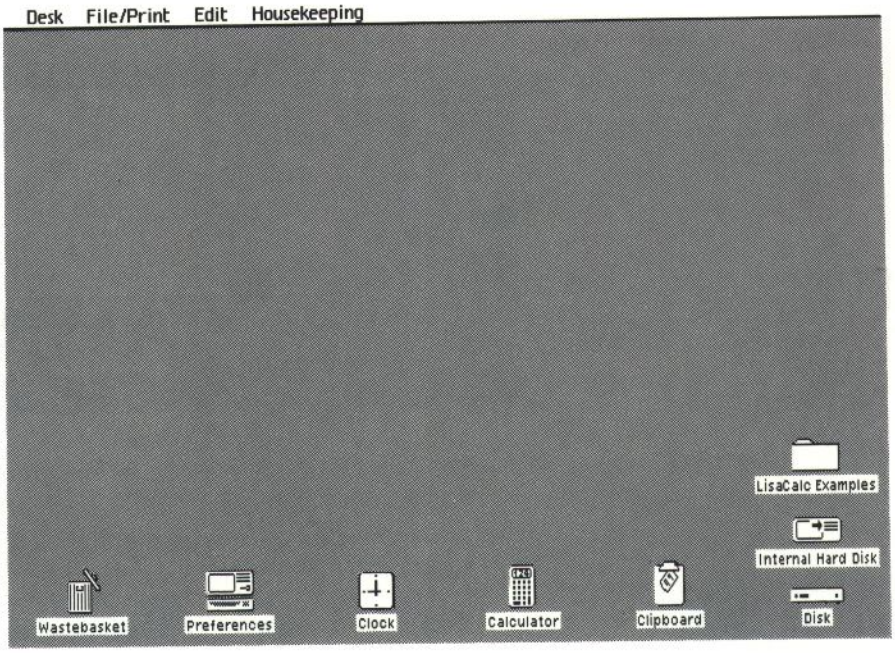
Note: You can always get back the last thing you've thrown away if you select the Wastebasket icon and move the deposited document back out.



▶▶▶

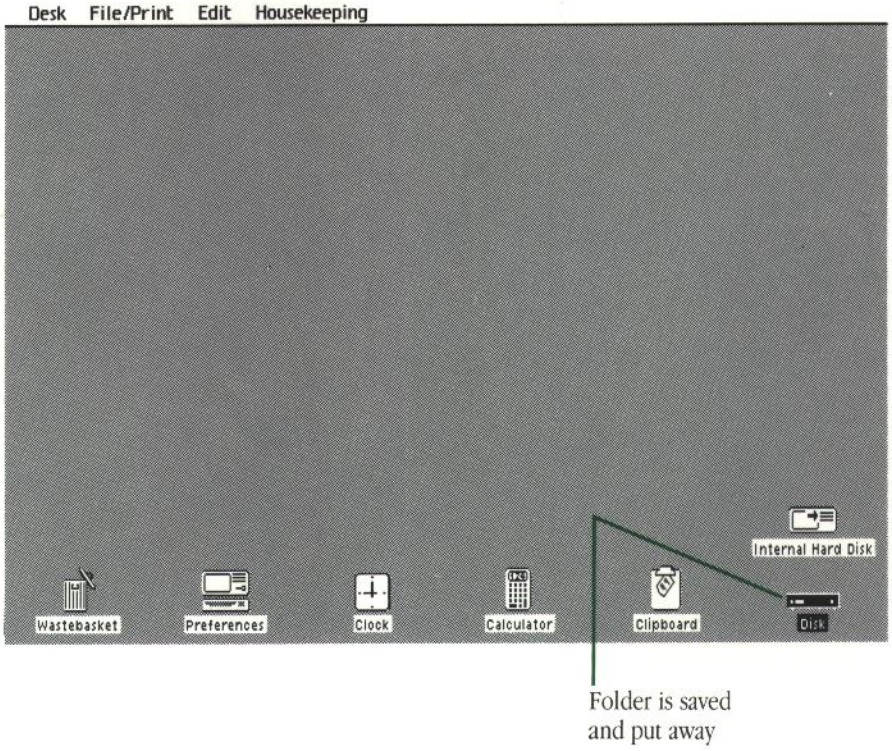
4 ▶ Now set aside both the LisaCalc Examples folder and the Disk icon by opening the **File/Print** menu and choosing **Set Aside Everything**.

Notice that both the Folder and Disk icons are now set aside on the desktop.



5 ▸ You can put away the LisaCalc Examples folder back in its filing home in the disk even when the disk window is closed. To do so, select the LisaCalc Examples folder, open the **File/Print** menu, and choose **Save & Put Away "LisaCalc Examples"**.

Note: If you want to deselect a selected icon, click once when the pointer is not over the icon.



6 ▸ When you are ready to work on something else, just open the disk again. When you want to turn off the Lisa's power — for example, over the weekend — press the lit on-off button. When you turn on the Lisa again, everything will reappear as you left it when you turned the Lisa off, including documents you may have left open on the desktop. Always leave the external hard disk, if you have one, turned on.

Using LisaCalc

You now have the basic skills needed to produce your own LisaCalc documents. Because the concepts for using each Lisa tool are the same, you also have some of the skills needed to use other Lisa tools: LisaDraw, LisaGraph, LisaList, LisaProject, and LisaWrite.

To learn more about LisaCalc, go on to Chapter 2, Using LisaCalc. If you have questions about specific LisaCalc features or menus, refer to Chapter 3, LisaCalc Reference.

Chapter 2

Using LisaCalc

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LisaCalc Essentials

The information on the following pages describes important concepts, terminology, and operations with which you should be familiar before using LisaCalc. You should read and understand this information before using the remainder of the chapter.

Before You Begin

Before you begin this chapter, be sure you've gone through Chapter 1, Learning LisaCalc, which gives you practice working with a LisaCalc document. You should now feel comfortable with special terms, such as *selecting* and *choosing,* used in reference to the Lisa.

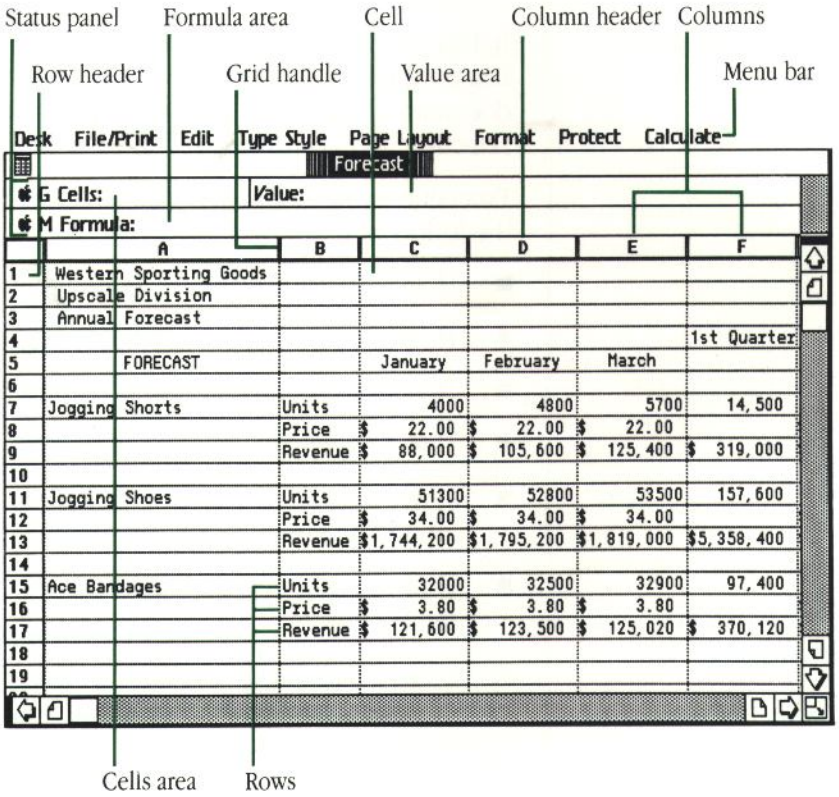
Procedures you should understand before beginning this chapter include the following:

- How to move the pointer around the screen using the mouse.
- How to open menus and choose menu items.
- How to select text or objects on the screen.
- How to open and save documents.
- How to change the size of a window and how to move a window around on the desktop.
- How to scroll the contents of the window to see different parts of the document.

If you need help, or if you want to refresh your memory, now is a good time to review LisaGuide once more. Refer also to Chapter 3, Basic Operations, in the *Lisa Office System* manual.

The LisaCalc Window

The following figure shows a typical LisaCalc spreadsheet as it appears on the screen. The different parts of the LisaCalc window are described below.



The Menu Bar shows the names of the LisaCalc menus that you can use to perform specific operations.

The Status Panel consists of three areas: the Cells Area, the Value Area, and the Formula Area.

> **The Cells Area** tells you which cell is currently selected.
>
> **The Value Area** displays the value contained in the currently selected cell.
>
> **The Formula Area** displays the formula (if any) contained in the currently selected cell.

Columns run vertically down the spreadsheet and are identified by the letters across the top.

Rows run horizontally across the spreadsheet, and are identified by the numbers down the left side.

A Cell is the intersection of any column and row in the spreadsheet. A cell is identified by its coordinates, which are the column letter followed by the row number; for example A1, B10, AA56.

The entire spreadsheet is 255 columns (lettered A through Z and AA through IU) by 255 rows (numbers 1 through 255).

A Column Header is the box at the top of a column. The column header contains the column letter and is used to select the column.

A Row Header is the box at the left of a row. The row header contains the row number and is used to select the row.

A Grid Handle is the dividing line between any two column or row headers. The grid handle is used to make a selection between columns or rows.

Selecting Parts of a Spreadsheet

When you want to perform any operation on a specific part of a spreadsheet, there are always two steps involved. These are:

1. Select the appropriate part of the spreadsheet.
2. Perform an operation on that part.

For example, to enter a number in a cell, you select the cell, then type and enter the number; to delete a column, you select the column and then cut it from the spreadsheet. The part of the spreadsheet you select is called the *selection.* The current selection is displayed in white letters on a black background (instead of the usual black on white). Selecting any other part of the spreadsheet cancels the previous selection.

You can select cells by typing cell coordinates in the Cells Area of the Status Panel, or by moving the pointer and clicking the mouse button. Both methods are described on the following pages. For complete information on basic selecting procedures, refer to the *Lisa Office System* manual.

To Select One Cell:

1 ▶ Click once in the cell.

or

1 ▶ Click once in the Cells Area of the Status Panel.

2 ▶ Type the coordinates of the cell (for example, A1).

3 ▶ Press Enter.

Note: You cannot select an individual cell, or part of the entry in a cell, while the spreadsheet is displayed with **Show Formulas and Values** in effect. See Displaying Formulas and Values under Changing the Appearance of a Spreadsheet.

To Select One or More Characters:

1 ▶ Click once in the cell that contains the characters.

2 ▶ Move the text pointer to the left of the first character (in the cell itself or the Value Area if the cell contains a value; in the Formula Area if the cell contains a formula).

3 ▶ Press and drag through the characters you want to select.

Note: You cannot do this when **Show Formulas and Values** is in effect.

To Select One Word:

1 ▶ Click once in the cell that contains the word.

2 ▶ Position the pointer anywhere in the word (in the cell itself or the Value Area if the cell contains a value; in the Formula Area if the cell contains a formula).

3 ▶ Double-click.

Note: You cannot do this when **Show Formulas and Values** is in effect.

To Select a Range of Cells:

1 ▶ Press and drag from a cell in one corner of the range to the cell in the opposite corner of the range.

or

1 ▶ Click once in the Cells Area of the Status Panel.

2 ▶ Type the coordinates of the range of cells, separated by a colon (for example, A1:B10).

3 ▶ Press Enter.

To Select One Column:

1 ▸ Click once in the column header.

or

1 ▸ Click once in the Cells Area of the Status Panel.

2 ▸ Type the column letter and press Enter.

To Select One Row:

1 ▸ Click once in the row header.

or

1 ▸ Click once in the Cells Area of the Status Panel.

2 ▸ Type the row number and press Enter.

To Select Several Adjacent Columns:

1 ▸ Press and drag from the first column header through to the last column header.

or

1 ▸ Click once in the Cells Area of the Status Panel.

2 ▸ Type the letters of the columns, separated by a colon (for example, B:K).

3 ▸ Press Enter.

To Select Several Adjacent Rows:

1 ▸ Press and drag from the first row header down to the last row header.

or

1 ▸ Click once in the Cells Area of the Status Panel.

2 ▸ Type the numbers of the rows, separated by a colon (for example, 1:25).

3 ▸ Press Enter.

To Extend the Current Selection:

1 ▸ Make sure at least one cell is already selected.

2 ▸ Move the pointer into the last cell in the larger range.

3 ▸ Hold down the Shift key and click once.

To Select the Entire Spreadsheet:

1 ▸ Open the **Edit** menu and choose **Select All of Document**.

or

1 ▸ Click once in the Cells Area of the Status Panel and type *all*.

To Deselect, or Select Nothing:

1 ▶ Click once in the Deselect box in the upper left corner of the spreadsheet.

Opening an Existing Spreadsheet

If you want to work with an existing spreadsheet that has been saved and put away, you have to begin by opening the spreadsheet. You can open a spreadsheet by using menus or by using a shortcut method with the mouse. The shortcut method is described later in this chapter under Shortcuts and Alternatives.

To Open an Existing Spreadsheet Using Menus:

1 ▶ Select the Disk or diskette by clicking once on its icon.

2 ▶ Open the **File/Print** menu and choose **Open "Disk"** or **Open "Diskette"**.

3 ▶ If you have filed the spreadsheet in a folder, click once on the folder's icon.

4 ▶ Open the **File/Print** menu and choose **Open "your folder"**.

5 ▶ Select your spreadsheet by clicking once on its icon.

6 ▶ Open the **File/Print** menu and choose **Open "your document"**.

After a Wait message, your spreadsheet is displayed on the screen.

Creating a New Spreadsheet

You can start a new spreadsheet either by using menus or by using a shortcut method with the mouse. The shortcut method is described later in this chapter under Shortcuts and Alternatives.

To Start a New Spreadsheet Using Menus:

1 ▶ Select the Disk by clicking once on its icon.

2 ▶ Open the **File/Print** menu and choose **Open "Disk"**.

3 ▶ Select the LisaCalc paper by clicking once on its icon.

LisaCalc Paper

4 ▶ Open the **File/Print** menu and choose **Tear Off Stationery**.

Wait while the new document is created.

5 ▶ Type a name for the new spreadsheet (the name can be of any length).

6 ▸ Open the **File/Print** menu and choose **Open "Your Document"**.

After a Wait message, the new spreadsheet is displayed.

Entering Values (Numbers, Text, or Dates) in a Spreadsheet

Any information contained in a cell is called a value. LisaCalc categorizes values into four types:

- Numbers.
- Text.
- Dates.
- Date parts.

Numbers

Numbers include whole and decimal numbers (for example: 5, − 5.2, $5.25). Numbers are automatically displayed in floating decimal style, so that .250 is displayed as .25

Text

Text includes words and phrases, as well as combinations of letters, numbers, and symbols (for example: Total Taxable Income, April 15, 1040A, 3:45).

Dates

Dates are calendar dates in the format 9/30/83. The date must correspond to a real calendar date. For example, 9/31/83 is not a date, because September only has 30 days. 9/31/83 would be categorized as a text value.

Date parts

Date Parts are numbers of days, weeks, months or years. A date part consists of a number followed by a calendar unit (for example: 10 days, 1 year, 9 months, 6 weeks). Weeks are automatically displayed as the equivalent number of days. For example, if you type *4 weeks* in a cell, the value is entered as 28 days.

Viewing the Entire Value of a Cell

A cell's value appears in the cell itself, as well as in the Value Area of the Status Panel. If you type a value that is too long to be displayed in the cell, LisaCalc may round it off, or display asterisks in the cell. To display the entire value in the cell itself, you can select the grid handle and widen the column. See Changing Column Width under Changing the Appearance of a Spreadsheet. The entire value always appears in the Status Panel when the cell is selected.

You can often make a long number fit in a cell by displaying it in a different number style. See Changing the Number Style of Entries under Changing the Appearance of a Spreadsheet.

To Enter a Value in a Cell:

1 ▸ Select the cell that you want to contain the value.

2 ▸ Type the value.

3 ▸ To enter the value in the cell, press Enter, or press a key that moves you to another cell in the spreadsheet. For example:

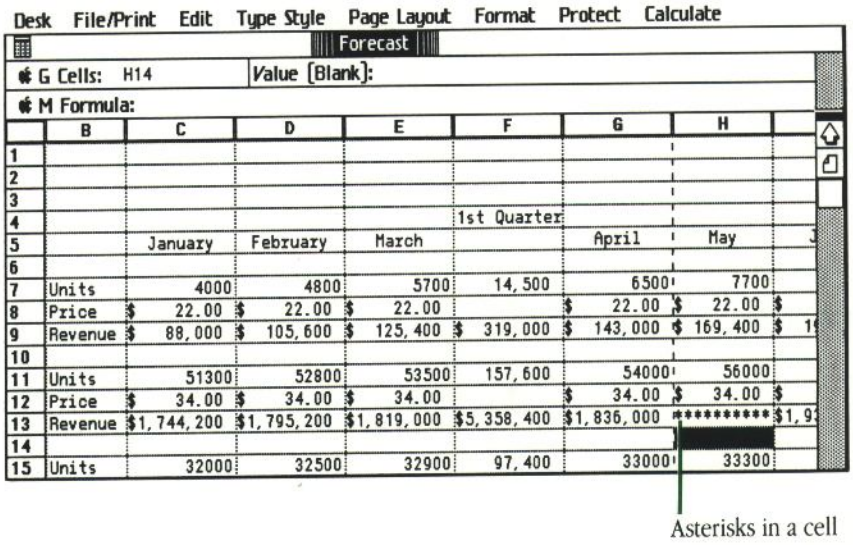
Press Tab between entries to move across the row.

Press the right arrow on the numeric keypad to move across the row.

Press the down arrow on the numeric keypad to move down the column.

The value appears in the selected cell and in the Value Area of the Status Panel.

If asterisks appear in the cell, read the above information on viewing the entire value of a cell.



Asterisks in a cell

4 ▸ Repeat steps 1 through 3 for each value you want to enter.

LisaCalc Formulas

A formula is a rule or equation which computes a value. You can use formulas to perform such operations as adding a column of numbers, calculating the number of days between two calendar dates, comparing two values, and performing many more complex mathematical operations.

You can use three basic types of formulas on a LisaCalc spreadsheet:

- Arithmetic formulas, to add, subtract, multiply, and divide values, and raise a value to an exponential power.
- Date formulas, to calculate dates and periods of days.
- Logical formulas, to compare two values.

You can construct a simple formula out of any one of these three basic kinds, or you can construct more complex formulas by combining the basic kinds.

You can also devise a wider variety of formulas by incorporating functions in a formula. Functions are predefined calculations provided by LisaCalc to perform common operations, such as adding a range of values, or finding the square root of a number.

Depending on the type of formulas you are using, formulas can contain:

- Numbers, dates, or date parts (for example, 2 + 2 or "12/25/83" + 2 weeks).
- Cell coordinates of cells that contain numbers, dates, or date parts (for example, C4 − F11 or B5/D4).
- Numbers combined with cell coordinates (for example, 2 + D10 or A3 + 2 weeks).
- Dates or date parts combined with cell coordinates (for example, "4/5/81" + B7 or G14 − 6 months).

The following information describes the basic types of LisaCalc formulas and explains how to enter them on a spreadsheet. For complete information on all LisaCalc formulas, see Formulas in Chapter 3.

Arithmetic Formulas

Arithmetic formulas perform mathematical operations on number values and yield numbers as a result.

You can use arithmetic formulas to add, subtract, multiply, divide, and raise numbers to an exponential power. When performing division, you have three methods to choose from: regular division; integer division, which discards the remainder and gives a whole number as the result; and remainder division, which gives the remainder from integer division as the result.

Here are some examples of arithmetic formulas.

Sample Arithmetic Formulas

Operation	Examples
Addition (+)	25 + 2 A3 + D6 B7 + 2
Subtraction (−)	25 − 2 A3 − D6 B7 − 2
Multiplication (*)	25*2 A3*D6 B7*2
Division (/)	25/2 A3/D6 B7/2
Integer division (DIV)	25 DIV 2 A3 DIV D6 B7 DIV 2
Remainder (REM)	25 REM 2 A3 REM D6 B7 REM 2
Exponentiation (^)	25^2 A3^D6 B7^2

When you type a number greater than or equal to 1,000 in a formula, don't type commas. LisaCalc will not accept commas in numbers that are typed in the Formula Area of the Status Panel.

Date Formulas

Date formulas can contain two kinds of values:

- Dates.
- Date parts.

Dates

Dates are calendar dates of the form 3/23/83 that correspond to real calendar dates. For example, 9/31/83 is not a date, because September only has 30 days.

Important: when you type a date in a formula, you must type quotation marks around the date, for example, "3/23/83" + 21 days. Otherwise, LisaCalc interprets 3/23/83 as a series of divisions. Quotation marks are not necessary when you enter the date directly into a cell.

Date Parts

Date parts are numbers of days, weeks, months or years. A date part consists of a number, followed by a calendar unit, for example, 10 days, or 1 year, or 9 months.

You can use date formulas to:

- Add or subtract dates and date parts.
- Convert the units in a date part from days to months or years and vice versa.

Adding or Subtracting Dates

Add or subtract dates and date parts when you want to know how many days lie between two dates, or what the date was 10 days ago, or what it will be 6 weeks from Friday.

Date formulas can contain dates and date parts, or the coordinates of cells that contain a date or date part (for example, D10 − C25 if cells D10 and C25 each contain a date or date part).

If you type a date in a formula, you must type quotation marks around the date.

This table shows examples of adding and subtracting dates and date parts.

Sample Date Formulas

Operation and Result	Examples
Date + Date Part = Date	"12/25/81" + 15 days D10 + 15 days
Date − Date Part = Date	"12/25/81" − 1 year B23 − 1 year
Date − Date = Date Part	"12/25/81" − "1/1/81" C5 − B10
Date Part + Date Part = Date Part	8 weeks + 12 days E15 + 2 weeks
Date Part − Date Part = Date Part	12 months − 6 weeks 12 days − A24

Converting Date Parts

Convert the units in a date part when you want the result of a date formula to be expressed in days rather than months or years, or vice versa.

For example, if you want the result of the formula 2 years + 200 days expressed in days, you must specify the conversion. You convert date parts by using the format:

(# date part) date part

For example:

(3 months)days displays the result *90 days*.

Here are some examples of converting date units.

Sample Date Conversions

Example	Conversion
(1 month)days	30 days
(1 year)days	365 days
(1 year)months	12 months
("12/25/81" − "1/1/81")months	11 months
(8 weeks + 310 days)years	1 years

Conversions are always expressed as whole numbers of calendar units. When there is a remainder, the number of units is always rounded down; for example, 7 weeks converts to 1 month.

When you enter a number of weeks in a cell or formula, LisaCalc automatically converts it to the equivalent number of days. That is, if you enter 3 weeks, LisaCalc displays 21 days in the cell. The conversion of weeks into days is the only automatic conversion of date parts by LisaCalc.

The word "Date" has a special meaning in LisaCalc. A cell containing the word Date displays the current date. You can also use Date within a formula to perform calculations on the current date. The term Date is called a constant. For complete information on all the LisaCalc constants, see Constants in Chapter 3.

Logical Formulas

Logical formulas compare values to see if they are the same or different, or to see if one is bigger or smaller than the other. For example, you can use logical formulas to determine whether the result of one formula is equal to the result of a second formula, or whether one date is earlier or later than a second date. The result of a logical formula is either True or False.

There are two kinds of logical formulas:

- Relational formulas, which compare number, text or date values. For example, C2 + 10 < 30.
- Compound formulas, which combine relational formulas with one of the logical operators AND, OR and NOT. For example, C2 + 10 < 30 AND D5 = January.

Relational Formulas

Relational formulas compare values. The result of a relational formula is always true or false.

Relational formulas can compare any of the following:

- Two numeric values.
- Two text values.
- Two dates or date parts.
- The results of two formulas.

In all of the above, you can use the cell's value in the comparison, or you can use the coordinates of a cell that contains the appropriate kind of value. If you compare the result of a formula, LisaCalc automatically calculates the arithmetic in the formula before making the comparison. For complete information on the order in which LisaCalc performs calculations and comparisons, see Rules for Using Compound Relational Formulas in the Formulas section of Chapter 3 .

Here are some examples of relational formulas.

Sample Relational Formulas

Operation	Example	Result
Less than (<)	25 + 2 < 25	False
Greater than (>)	25 + 2 > 25	True
Equal to (=)	25 + 2 = 25	False
Less than or equal to (<=)	25 + 2 <= 25	False
Greater than or equal to (>=)	25 + 2 >= 25	True
Not equal to (<>)	25 + 2 <> 25	True

When you compare two dates, Less Than means earlier than, and Greater Than means later than. When you compare text values or date parts, the only operations you can use are Equal To and Not Equal To.

Compound Relational Formulas

Compound relational formulas compare the results of logical formulas by using the logical operators AND, OR and NOT. Like relational formulas, the result is always True or False.

AND compares the results of two logical formulas. If both of the relational formulas are true, the result of the compound formula is True. If one of the relational formulas is false, or if both are false, the result of the compound formula is False.

OR compares the results of two logical formulas. If either one of the relational formulas is true, or if both are true, the result of the compound formula is True. If both relational formulas are false, the result of the compound formula is False.

NOT looks at the result of one logical formula. Essentially, the NOT formula gives you the opposite result of the relational formula. If the result of the relational formula is False, the result of the compound formula is True. If the result of the relational formula is True, the result of the compound formula is False.

Like relational formulas, compound formulas can compare the result of two formulas. LisaCalc automatically calculates the arithmetic in the formula before making the comparison. For information on the order in which LisaCalc performs calculations and comparisons, see Rules for Comparing Compound Relational Formulas in the Formulas section of Chapter 3.

Below are a few examples of compound formulas. These sample formulas all contain numbers. However, you can construct a compound formula from any combination of relational formulas or logical formulas.

Sample Compound Formulas

Operation	Sample Formula	Result
AND	6 < 7 AND 25 + 2 < 25	False
	7 > 6 AND 25 < 25 + 2	True
OR	6 < 7 OR 25 + 2 < 25	True
	7 < 6 OR 25 > 25 + 2	False
NOT	NOT 25 + 2 < 25	True
	NOT 25 < 25 + 2	False

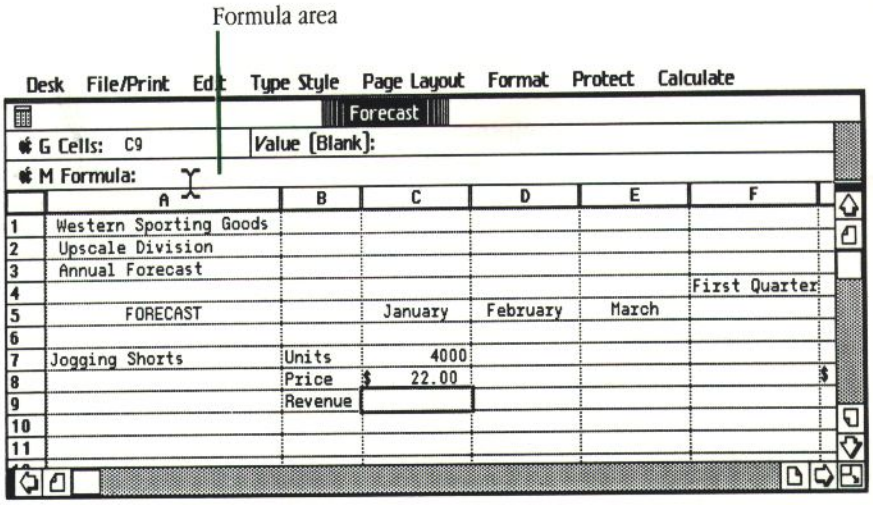
Entering Formulas in a Spreadsheet

You enter formulas in the spreadsheet differently than you enter numbers, text, dates, and date parts. You enter all formulas by typing in the Formulas Area of the Status Panel. This tells LisaCalc that your entry is a formula and not text, numbers, or dates.

To Enter a Formula:

1 ▶ Select the cell that is to contain the formula.

2 ▶ Click once in the Formula Area of the Status Panel.

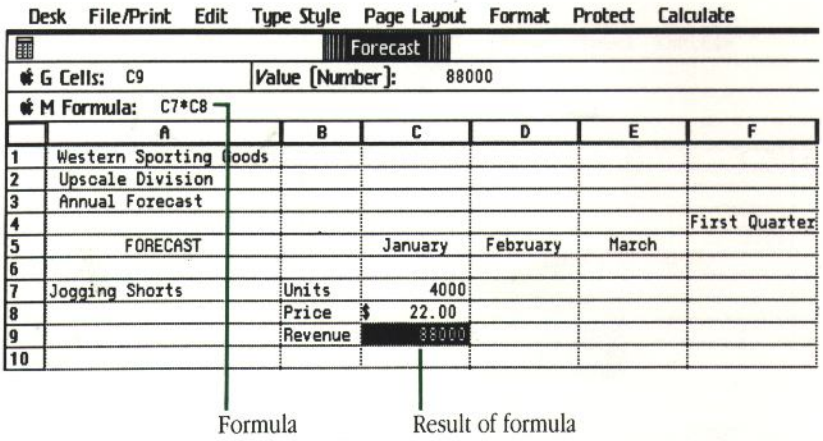


3 ▶ Type the formula.

If you need help writing the formula, see the information on the previous pages.

4 ▶ Press Enter to enter the formula.

The formula appears in the Formula Area and the resulting value appears in the cell.



	A		B	C	D	E	F
1	Western Sporting Goods						
2	Upscale Division						
3	Annual Forecast						
4							First Quarter
5	FORECAST			January	February	March	
6							
7	Jogging Shorts		Units	4000			
8			Price	$ 22.00			
9			Revenue	88000			
10							

If you want to use the mouse to enter cell coordinates in the formula, see Shortcuts and Alternatives later in this chapter.

Copying Formulas to Other Cells (Replicating)

LisaCalc allows you to copy a formula from one part of the spreadsheet to another. You type the formula once and copy it for use in other parts of the spreadsheet. This saves repetitive typing when you are performing similiar calculations in different parts of a spreadsheet.

You begin copying a formula by selecting the cell that contains the formula, and copying it to the Clipboard. You can paste this entry into the spreadsheet as many times as you like, but the Clipboard can hold only one entry at a time. Once you cut or copy a second entry, you replace the first entry on the Clipboard.

After you have copied the formula to the Clipboard, you need to select the new location for the formula in the spreadsheet. The new location can be a single cell, or any range of cells, including several rows or columns.

The cells you select do not have to be blank; if you paste over cells that already contain entries, the entries from the Clipboard replace the current entries in the cells.

If you try to paste over cells that are protected, an alert message tells you that these cells are protected. You can still paste over the cells, but the protection status may change. For more information, see Protecting Entries from Change under Changing the Appearance of the Spreadsheet.

Pasting Formulas

After you have selected a new location, you paste the formula from the Clipboard into that location. When you paste formulas, you have three choices:

- Paste.
- Paste Values.
- Paste Adjusting.

All of these choices preserve the alignment option, number style, and protection status of the original cell. However, the three **Paste** options have different results for the formula itself. These are described below. In each example, the spreadsheet is shown with **Show Formulas and Values** in effect so that you can see the formulas and their results.

Paste puts a copy of the formula in the new location. This means that the result of the original formula appears in the new location. Use this option when you want the result of a calculation to appear in another part of the spreadsheet.

In the following example, cells B9 and C9 were copied and then pasted into cells B10 and C10 with **Paste**. Both the value and the formula in the pasted cells are exactly the same as the original cells.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Forecast

G Cells: B10:C10 | Value:

M Formula:

	A	B	C	D	E	F
1	Western Sporting Goods					
2	Upscale Division					
3	Annual Forecast					
4						First Qua
5	FORECAST		January	February	March	
6						
7	Jogging Shorts	Units	4000			
8		Price	$ 22.00			
9		Revenue	C7*C8= $ 88,000			
10		Revenue	C7*C8= $ 88,000			

When you use Paste to copy a range of cells that contains a formula, the formula is changed to maintain the relationship between the formula and the other cells in the range. In the following example, the formula in cell C9 is changed to refer to the new range of cells.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Forecast

G Cells: D7:D9 | Value:

M Formula:

	A	B	C	D	E	F
1	Western Sporting Goods					
2	Upscale Division					
3	Annual Forecast					
4						First Qua
5	FORECAST		January	February	March	
6						
7	Jogging Shorts	Units	4000	4000		
8		Price	$ 22.00	$ 22.00		
9		Revenue	C7*C8= $ 88,000	D7*D8= $ 88,000		
10						
11						

Paste Values puts the result of the formula (not the formula itself) in the new location. The new cell does not contain the formula, only the result of the formula before you pasted it.

In the following example, cells B9 and C9 were copied and then pasted into cells B10 and C10 with **Paste Values**. Only the result of the formula is pasted in the new cells.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Forecast

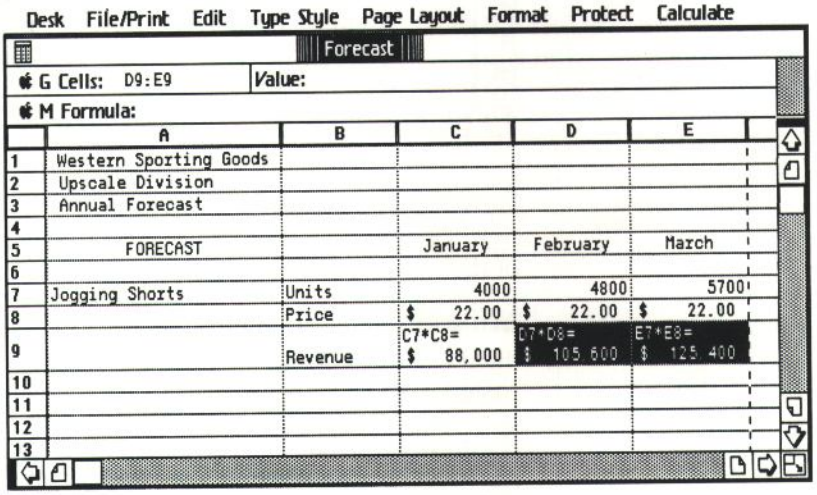
G Cells: B10:C10 | Value:

M Formula:

	A	B	C	D	E	F
1	Western Sporting Goods					
2	Upscale Division					
3	Annual Forecast					
4						First Qua
5	FORECAST		January	February	March	
6						
7	Jogging Shorts	Units	4000			
8		Price	$ 22.00			
9		Revenue	C7*C8= $ 88,000			
10		Revenue	$ 88,000			
11						

Paste Adjusting puts a copy of the formula in the new location with the parameters of the formula adjusted so that the new formula and its parameters refer to the same *relative* positions as the old formula and its parameters. In the example below, cell C9 contains the formula C7*C8 to calculate total January revenue.

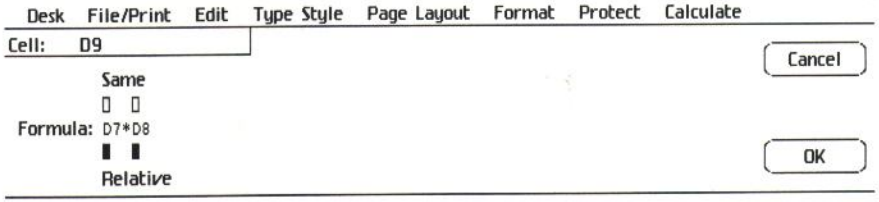
You need a similar formula in cells D9 and E9 to calculate February and March revenue. Instead of retyping a new formula each time, you can copy the original formula and have LisaCalc adjust it for the new location. In this way, cell D9 contains the formula D7*D8, and in cell E9 the formula becomes E7*E8. This is useful for entering formulas quickly when you want to perform similar calculations in several parts of the spreadsheet.



Same or *Relative Adjusting* When you choose **Paste Adjusting**, a dialog box is displayed, asking whether you want the cell coordinates in the formula to be the same or relative.

When the box first appears, *Relative* is checked for each cell in the formula. This means that each cell coordinate in the formula will be adjusted relative to the new location when you paste the formula. If you choose *Same*, the original cell coordinates are pasted with the formula.

To choose *Same* or *Relative*, check the option you want by clicking in the appropriate box. Once you have checked these options, click OK to paste the cells. If you want all of the coordinates to be relative, ignore the boxes and click OK.

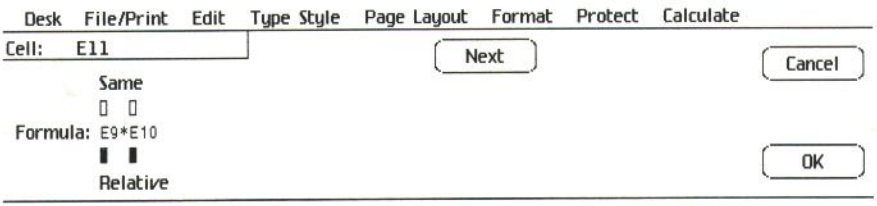


You can adjust each cell in the formula separately to have the formula refer to some cells in the old location (*Same*) and some relative to the new location (*Relative*). For example, if you have a number that you want to use in many calculations (such as mileage rate for an expense report), you can enter this number in the original formula, and adjust the formula to refer back to this same cell when you paste the formula in new locations. The other cell in the formula, however, would be *Relative* to its new location.

Adjusting a range of cells If a formula refers to a range of cells (for example, Sum(A1:A10)), only one checkbox appears in the dialog box for the entire range. The entire range must be either the *Same* or *Relative*. If you are pasting a formula in a different row and column from its original location, two checkboxes appear for each cell — one for the column letter, and one for the row number. You can change the column and row coordinates separately for each cell in the formula.

You can paste one formula into more than one cell on the spreadsheet by selecting all the cells you want before you choose **Paste Adjusting**. When the dialog box appears, you only adjust the formula for the first cell in the selected range. LisaCalc automatically adjusts the formula for the rest of the cells in the same way.

Pasting several formulas at once You can paste several formulas at once by copying a range of cells that contain several formulas. When you choose Paste Adjusting for this range, a dialog box appears that lets you adjust the formulas one at a time for the new location. If you click OK and ignore the *Same* or *Relative* boxes, all the formulas you are pasting will be adjusted for the new location. If you want to change some of the formulas to *Same*, click Next to adjust the formulas individually. If you want to go back to an earlier formula, click Previous. When you have adjusted all the formulas, click OK.



To Copy a Formula to Another Part of the Spreadsheet:

1 ▸ Select the cell that contains the formula.

2 ▸ Open the **Edit** menu and choose **Copy**.

The selected formula is automatically copied to the Clipboard.

3 ▸ Select the new location for the formula. If you need help, see Selecting Parts of a Spreadsheet.

4 ▸ Open the **Edit** menu and choose one of the **Paste** options (**Paste**, **Paste Values**, or **Paste Adjusting**). If you need help, see Pasting the Formulas into the New Location.

5 ▸ If you chose **Paste Adjusting**, check the appropriate boxes in the dialog box. If you need help, see Same or Relative Adjusting.

The formulas from the Clipboard are copied into the new location.

Entering Functions in a Spreadsheet

Functions are used in formulas to perform predefined sets of operations on values. The entire formula for a cell can consist of one function, or a formula can contain several functions, combined with basic operations like arithmetic.

A function is made up of two parts: the function name followed by its arguments. The arguments are enclosed in parentheses and separated by commas. For example, *Round(3.8775, 2)* rounds 3.8775 to two decimal places.

The name of the function is a word or abbreviation summarizing what the function does. For example, Sum adds numbers. You use the Sum function to add a series of numbers, such as those in a row or column.

The arguments of a function are the values on which the function bases its calculations. Different functions require different types and numbers of arguments.

The following information describes how to enter a function on a spreadsheet. For complete information on the many LisaCalc functions, see Functions in Chapter 3.

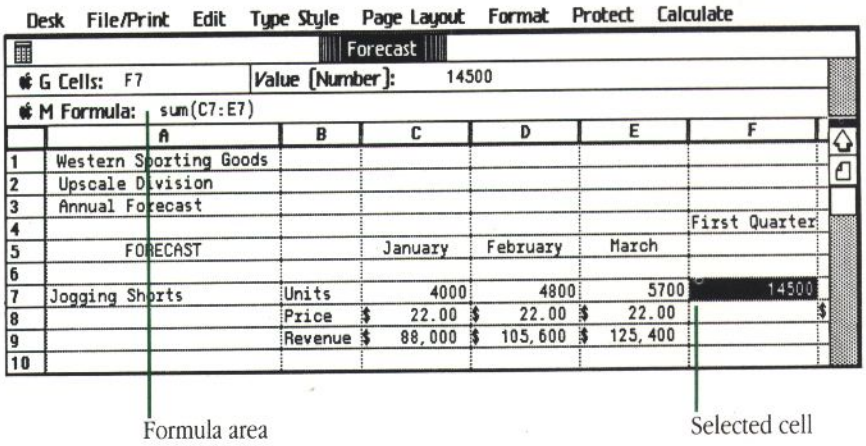
To Enter a Function:

1 ▸ Select the cell that is to contain the function.

2 ▸ Click once in the Formula Area of the Status Panel.

3 ▸ Type the name of the function, followed by the function arguments enclosed in parentheses, and separated by commas if there is more than one argument.

If you need help, see Functions in Chapter 3.



	A	B	C	D	E	F
1	Western Sporting Goods					
2	Upscale Division					
3	Annual Forecast					
4						First Quarter
5	FORECAST		January	February	March	
6						
7	Jogging Shorts	Units	4000	4800	5700	14500
8		Price	$ 22.00	$ 22.00	$ 22.00	$
9		Revenue	$ 88,000	$ 105,600	$ 125,400	
10						

4 ▸ Press Enter to enter the function.

The result of the function is calculated and displayed in the cell. The function itself appears in the Formula Area of the Status Panel.

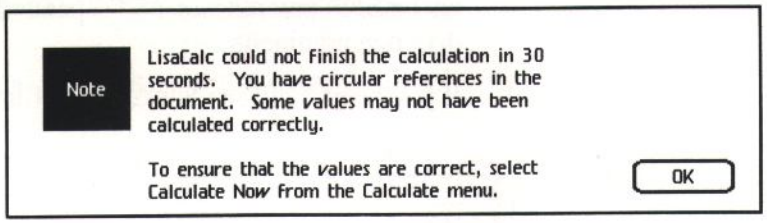
Choosing When To Calculate Formulas

The calculate menu contains three items that allow you to decide when LisaCalc should calculate or update the results of formulas in the spreadsheet:

- Calculate Automatically.
- Calculate Manually.
- Calculate Now.

Calculate Automatically

Calculate Automatically is already in effect when you first create a spreadsheet; if you enter a new value in a cell, LisaCalc immediately recalculates the values of all formulas that refer to that cell. While calculations take only a second or two in most cases, if formulas are very complex or the spreadsheet is very large, LisaCalc calculates for 30 seconds and then stops. At that point, the following alert message appears.



This message means one of two things:

- Either the spreadsheet contains a circular formula (one that refers back to its own result)

  or

- The spreadsheet is too complex to be calculated in 30 seconds.

For information on circular formulas, see Calculating a Formula under Fixing Common Problems.

If you have ruled out the possibility of circular formulas, choose **Calculate Now** to restart the calculation, which will run until the entire spreadsheet has been recalculated.

You can stop recalculation at any time by holding down the Apple key and typing a period.

Calculate Manually

Calculate Manually allows you to delay recalculation of formulas until you indicate that they should be recalculated. This is useful if automatic recalculation after each new entry would take too much time. When you are ready to recalculate, choose **Calculate Now**.

While **Calculate Manually** is in effect, the values shown in cells with formulas may not be correct. These cells only display the results of the most recent calculation. If you have filled in new cells or changed some cells since then, you must choose **Calculate Now** to see the updated results.

Calculate Now

Calculate Now causes LisaCalc to begin a complete recalculation of the formulas in the spreadsheet. You use **Calculate Now** in two situations:

- To restart calculations that LisaCalc has interrupted. LisaCalc interrupts calculations after 30 seconds while **Calculate Automatically** is in effect and when there are circular formulas in the spreadsheet. (See **Calculate Automatically**.)
- To recalculate the values of formulas in the spreadsheet while **Calculate Manually** is in effect.

When you choose **Calculate Now**, LisaCalc begins recalculating formulas immediately, and continues until all the formulas in the spreadsheet have been recalculated. While a new result is being calculated for a cell, the cell appears shaded in gray.

Unlike automatic calculation, calculations that begin when you choose **Calculate Now** are not interrupted after 30 seconds. If your spreadsheet contains a circular formula (a formula that refers back to its own result), LisaCalc will go on calculating indefinitely. For more information on circular formulas, see Fixing Common Problems.

You can halt a calculation that seems to be going on for too long by holding down the Apple key and typing a period.

To Choose When the Results of Formulas are Calculated:

1▸ Open the **Calculate** menu and select one of these options: **Calculate Automatically**, **Calculate Manually**, or **Calculate Now**.

Basic Editing Operations

The basic Lisa editing operations allow you to edit entries in a spreadsheet. You can:

- Change an entry.
- Insert or delete information in an entry.
- Insert or delete a row or column.

If you change your mind, you can cancel an editing operation by undoing the effect of the last change or restoring the previous entry.

The information on the following pages describes editing a LisaCalc spreadsheet. If you haven't already entered information on the spreadsheet, refer to Entering Values on a Spreadsheet or Entering Formulas on a Spreadsheet earlier in this chapter. For complete information on Lisa editing operations, see the *Lisa Office System* manual.

Changing an Entry

Changing an entry replaces the current entry with the new one you type. You can change the complete entry or part of an entry in a cell. If the entry you are changing is a value (number, text, or date), you can type it directly in the cell or in the Value Area of the Status Panel. If the entry you are changing is a formula, you must type it in the Formula Area of the Status Panel.

To Change an Entry in a Cell:

1▶ Select the cell that contains the entry.

2▶ If you are changing a formula, click once in the Formula Area.

3▶ If you want to change the whole entry, go on to step 4. If you want to change part of the entry, press and drag through the part you want to change.

4▶ Type the new entry which immediately replaces the previous entry.

If the new entry is too wide for the column, select the grid handle and widen the column (see Changing Column Width under Changing the Appearance of the Spreadsheet.)

If you change your mind about the new entry, open the **Edit** menu and choose **Undo Last Change** or **Restore Previous Entry**.

5▶ Press Enter to make the new entry.

If you changed a formula, LisaCalc computes the new result and displays it in the cell.

Inserting Information in a Cell

You can insert letters, numbers or words in a blank cell, or in a cell that already contains an entry. If you insert information in a cell that contains a value, you can insert directly in the cell, or in the Value Area of the Status Panel. If you insert information in a cell that contains a formula, you must insert in the Formula Area of the Status Panel.

To Insert Information in a Cell:

1▸ Select the cell where you want to insert information.

2▸ If the cell is blank, go on to step 3.

Click once where you want to begin inserting. If the cell contains a value, you can do this either in the cell or in the Value Area. If the cell contains a formula, do this in the Formula Area of the Status Panel.

3▸ Type the information you want to insert.

4▸ Press Enter to enter the new value on the spreadsheet.

If you revised a formula, LisaCalc computes the new result of the formula and displays it in the cell.

Inserting a Row or Column

You can insert a blank row or column anywhere in the spreadsheet. You can enter new information in the row or column, or leave it blank to create space between sections of the spreadsheet.

Inserting a Row

When you insert a row, it is given a number in sequence with the rows above it. The rows following the new row are automatically renumbered so that rows are always numbered consecutively.

When LisaCalc renumbers the rows, it also adjusts formulas so that they refer to the cells by their new coordinates. If a formula refers to a range of cells that spans across an added row, the cells in the new row are now included in the range.

You can have a maximum of 255 rows in a spreadsheet.

Inserting a Column

When you insert a column, it is automatically given a letter in sequence with the columns to its left so that columns are always lettered consecutively.

When LisaCalc relabels the columns, it also adjusts formulas so that they refer to the cells by their new coordinates. If a formula refers to a range of cells that spans across an added column, the cells in the new column are now included in the range.

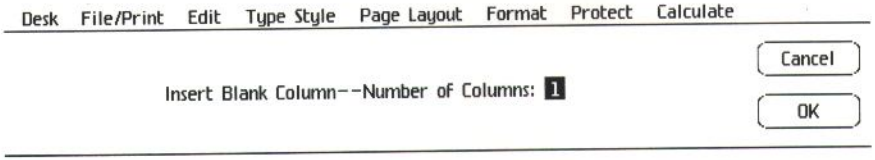
You can have a maximum of 255 columns in a spreadsheet.

To Insert a Row or Column:

1 ▶ Select the grid handle between the two rows or columns where you want to insert.

2 ▶ Open the **Edit** menu and choose **Insert Blank [Row** *or* **Column]**.

A dialog box appears giving you the option to insert several rows or columns. If you want to insert one row or column, click OK; otherwise type the number of rows or columns you want to add and then click OK.



The number of blank rows or columns you specified appears, and the following rows and columns are renumbered appropriately.
If you like, you can now enter information in the new rows or columns.

Deleting Entries, Rows, or Columns

There are two ways to delete selected entries from the spreadsheet:

- Cut entries.
- Clear entries.

Both cutting and clearing entries deletes the selected information from the spreadsheet. The differences between cutting and clearing are described on pages 71 and 72.

Clipboard

Cut entries are placed on the Clipboard so that they can be pasted back into the spreadsheet. Cleared entries are not placed on the Clipboard.

Protected Cells

You can cut protected cells, but you cannot clear protected cells.

Formulas

If you cut a cell that is referred to in a formula, the cell containing the formula displays "Error". If you clear a cell that is referred to in a formula, a new result is calculated for the formula, using a value of 0 for the cleared cell.

Rows and Columns

If you cut an entire row or column, the row or column itself is removed from the spreadsheet. Remaining rows or columns are renumbered in sequence. If you clear an entire row or column, the information is removed, but the blank row or column remains in the spreadsheet.

Alignment and Number Style

Both cutting and clearing entries retains any alignment option or number style that you had previously chosen for the cells.

Cutting

You can cut any portion of the spreadsheet, from an individual cell up to complete columns or rows. Cutting a selection deletes it and places it on the Clipboard. Anything that is on the Clipboard can be pasted back into the spreadsheet at the same or another location. You will often cut a group of cells because you want to move it to a new location (see Moving and Copying Information). You can also cut an entry to completely remove it from the spreadsheet.

Only one selection at a time can be placed on the Clipboard; when you go on to cut or copy a second selection of cells, you replace the first entry on the Clipboard. If you want to paste an entry back into the spreadsheet, you must choose **Paste** from the **Edit** menu before cutting or copying anything else.

If you cut a cell that a formula refers to, LisaCalc discovers that the entry is on the Clipboard and displays "Error" in the cell that contains the formula. When you paste the cut cell into another location, the error is corrected; if you leave the cell on the Clipboard, an error remains.

To Cut:

1 ▸ Select the cell, row, column, or range of cells that you want to cut.

2 ▸ Open the **Edit** menu and choose **Cut**.

The selected entries are cut from the spreadsheet and automatically placed on the Clipboard.

If you change your mind about cutting the entries, open the **Edit** menu and choose **Paste** or **Restore Previous Entry**.

Clearing Entries

You can clear any portion of the spreadsheet, from an individual cell up to complete columns or rows. Clearing entries deletes the selected entry from the spreadsheet *without* placing it on the Clipboard. If you want the entry to be placed on the Clipboard so that you can paste it back into the spreadsheet, you should Cut instead of Clearing (see Cutting Entries).

If you change your mind after you have cleared entries, immediately open the **Edit** menu and choose **Undo Last Change** to replace the entries. When you press Enter or select another part of the spreadsheet, you can no longer undo the change.

If you clear a cell that a formula refers to, LisaCalc recalculates the result of the formula, treating the cleared cell as if it contained a value of zero.

To Clear:

1 ▸ Select the cell, row, column, or range of cells that you want to clear.

2 ▸ Open the **Edit** menu and choose **Clear**, or press the Clear key for the same result (the Clear key is at the top left of the numeric keypad).

The selected entries are cleared from the spreadsheet.

If you change your mind about clearing the entries, open the **Edit** menu and choose **Undo Last Change**.

Cancelling an Editing Operation

If you don't like a change you have just made to the spreadsheet, you can usually reverse the effects of the last change. There are two ways to cancel a change:

- Undo the last change.
- Restore the previous entry.

Undo the last change to cancel the very last change you made to a cell, row, or column (for example, aligning values in cells, changing column width, or inserting a blank row or column).

Restore the previous entry when you are making changes to the contents of a cell and want to put the entry back as it was before you started changing it.

Undoing the Last Change

If don't like a change you have just made to the spreadsheet, you can undo the last change to reverse the effects of the change. For example, if you clear a column accidentally, you can bring back the entries in the column by undoing the last change.

You can use **Undo Last Change** to undo most editing operations. You can also undo operations that change the appearance of a spreadsheet, such as aligning values in cells, choosing a number style, adjusting column width, and so on.

There are some operations that you cannot undo. These are:

- Saving operations.
- Printing operations.
- Selecting parts of the spreadsheet.
- Entering values or formulas in cells after you have pressed Enter. After you press the Enter key or select another cell, you cannot undo any changes you have made to the cell.

To Undo the Last Change You Made:

1 ▸ Open the **Edit** menu and choose **Undo Last Change**.

LisaCalc reverses the effect of the very last change you made on the spreadsheet.

If the last change you made cannot be reversed, an alert message tells you so. If this happens, edit the spreadsheet yourself to restore it the way you want.

Restoring the Previous Entry

The previous entry is the entry that was in a cell before you made changes to it. Restoring the previous entry cancels all changes made to a cell since it was selected. This is useful when you make changes to a cell and then decide you preferred it the way it was.

You can only restore the previous entry while you are editing a cell and the cell is still selected. As soon as you select another cell or press the Enter key, you cannot restore the previous entry. You cannot restore the contents of a cell that you have deleted with **Clear Entries**. To restore a cleared entry, see Undoing the Last Change.

To Restore the Previous Entry:

1 ▸ Open the **Edit** menu and choose **Restore Previous Entry**.

LisaCalc cancels all the changes you made to the cell since you selected it, and the entry returns to the way it was before you changed it.

Moving and Copying Information

You can move or copy information from one part of a spreadsheet to another, or even to a different spreadsheet. You can move or copy:

- A single cell.
- Part of the entry in a cell.
- One or more rows.
- One or more columns.
- Any range of cells.

Moving Information

Move information when you want to take information out of one place in the spreadsheet and put it into another place. When you move information, it is cut from the spreadsheet and placed on the Clipboard. You can then paste this information back into other locations in the spreadsheet. The information is taken out of its original location when you move it.

Copying Information

Copy information when you want to leave the information in its original place in the spreadsheet, but repeat the same (or similar) information in another place. After copying, you can change any entries that you want to be different from the original information. When you copy information, LisaCalc places the copy on the Clipboard. You can then paste this copy into other locations.

Clipboard

Anything that is on the Clipboard can be pasted into the spreadsheet as many times as you like. However, the Clipboard can only hold one entry at a time. When you cut or copy a second entry, it replaces the previous entry.

There are four steps in moving or copying information:

1. Select the information you want to move or copy.
2. Cut or copy the selected information to the Clipboard.
3. Select a new location for the information.
4. Paste the cut or copied information into the new location.

You must paste into an area that is at least as large as the area you cut or copied. You can select an area that is several times larger, but you cannot move or copy to an area that is a different shape. LisaCalc automatically pastes enough copies into the selected area to fill it.

The following table describes the results of pasting various parts of a spreadsheet. For complete information on selecting, see Selecting Parts of a Spreadsheet.

Pasting Entries

Cut or Copy this to the Clipboard	Select this Part of the Spreadsheet	Paste for this Result
One cell	One cell	Exact copy
One cell	Several cells	Exact copy in each cell
Several cells	The same number of cells	Exact copy
A number of cells	A multiple of that number of cells	Enough exact copies to fill the cells
One column	One column	Exact copy
A number of columns	The same number of columns	Exact copy
A number of columns	A larger number of columns	One exact copy; the extra columns are deleted

Pasting Entries

Cut or Copy this to the Clipboard	Select this Part of the Spreadsheet	Paste for this Result
One row	One row	Exact copy
A number of rows	The same number of rows	Exact copy
A number of rows	A larger number of rows	One exact copy; the extra rows are deleted

If you are pasting a range of cells, a convenient way to select the new location for the cells is to select only the cell in the upper left corner of the new location and let LisaCalc paste into the remaining necessary cells.

Rules for Pasting

1. The cells you select do not have to be blank; if you paste over cells that already contain entries, the entries from the Clipboard replace the current entries in the cells.
2. If you try to paste over cells that are protected, an alert message tells you these cells are protected. You can still paste over the cells, but the protection status may change. For more information, see Protecting Entries from Change.
3. When you paste a row or column into an area of a larger size, LisaCalc treats this as a replacement of the old information with the new, and so deletes the extra area. For example, if you paste two columns into an area of three columns, the third column is deleted even if the third column contains information.
4. Use **Paste** for all entries that do not contain formulas. Formulas are moved and copied with **Paste Values** and **Paste Adjusting** (see Repeating a Formula in Other Cells).

To Move or Copy Information in the Same Spreadsheet:

1 ▸ Select the entries you want to move or copy.

2 ▸ Open the **Edit** menu and choose **Cut** to move entries; choose **Copy** to copy entries.

3 ▸ Select the new location for the entries.

4 ▸ Open the **Edit** menu and choose one of the following paste options: **Paste** to paste the information; **Paste Values** to paste the results of formulas; **Paste Adjusting** to paste formulas after adjusting them for the new location.

For more information on **Paste Values** and **Paste Adjusting**, see Copying Formulas Into Other Cells earlier in this chapter.

To Move or Copy Information to Another Spreadsheet:

1 ▸ Select the entries you want to move or copy.

2 ▸ Open the **Edit** menu and choose **Cut** to move the entries; choose **Copy** to copy the entries.

3 ▸ Open the other spreadsheet by double-clicking on its icon. (For more information on double-clicking, see Shortcuts and Alternatives.)

4 ▸ Select the location for the entries in the new spreadsheet.

5 ▸ Open the **Edit** menu and choose one of the following paste options: **Paste** to paste the information; **Paste Values** to paste the results of formulas; **Paste Adjusting** to paste formulas after adjusting them for the new location.

For more information on **Paste Values** and **Paste Adjusting**, see Copying Formulas Into Other Cells earlier in this chapter.

Protecting Entries from Change

LisaCalc allows you to designate selected cells as protected, which means that you can only change their contents in a few ways. By protecting cells, you can prevent accidental changes being made to entries.

Note: *You can only protect cells from being changed while you are calculating or entering values and formulas on the spreadsheet. Information in protected cells can be changed or lost due to cuts or moves that affect those cells.*

There are three choices for protecting cells:

- Protect Formulas and Values.
- Protect Formulas Only.
- Unprotect.

Protect Formulas and Values means that you cannot clear a cell that contains a formula or a value.

Protect Formulas Only means that you cannot clear or edit the contents of a cell that contains a formula.

Unprotect is automatically in effect for all cells when you create the spreadsheet. Choose **Unprotect** when you want to remove protected status from cells.

The **Protect** menu also allows you to check the status of a protected cell at any time.

Protecting Formulas and Values

Use **Protect Formulas and Values** to avoid accidentally clearing or changing the contents of cells. Protecting cells with **Protect Formulas and Values** has the following results.

You cannot:

- Clear cells.
- Edit a value.

You can:

- Edit a formula.
- Move and copy cells.
- Paste over cells.

If you protect a group of cells, the whole group is protected, including cells that are currently blank. You cannot fill in the blank cells unless you unprotect them.

Protecting Formulas Only

Use **Protect Formulas Only** to avoid accidentally clearing or changing formulas in cells. **Protect Formulas Only** has the following results.

You cannot:

- Clear cells that contain a formula.

You can:

- Edit formulas and values.
- Move and copy cells.
- Paste over cells.

If you protect a group of cells, the whole group is protected, including cells that contain values and cells that are currently blank. You can edit the cells that contain values, and fill in blank cells. If you enter a formula in one of these blank cells, the formula is protected and cannot be cleared.

Unprotecting Cells

You can enter, change, or delete entries in cells that are unprotected. **Unprotect** is in effect for all cells when you first create a spreadsheet.

If you have protected cells that you no longer want to be protected, choose **Unprotect** when you want to remove the protected status from these cells.

To Protect or Unprotect Cells:

1 ▸ Select the cell, row, column, or range of cells you want to protect or unprotect.

If you need help, see Selecting Parts of a Spreadsheet.

2 ▸ Open the **Protect** menu and choose one of the following: **Protect Formulas and Values**, **Protect Values Only**, **Unprotect**. If you need help, see the information on the previous pages.

The selected cells now have the protection status you specified.

Checking If a Cell is Protected

When cells are protected, they don't look any different from cells that are not protected. To check if a cell is protected, you have to open the **Protect** menu.

You can check the status of individual cells in this way, but you cannot check rows, columns, or a range of cells. To quickly see which cells on the spreadsheet are protected, see Circling Cells with Special Status.

To Check If a Cell is Protected:

1 ▸ Select the cell you want to check.

2 ▸ Open the **Protect** menu.

If the cell is protected, a check mark appears beside one of the **Protect** choices in the menu. If the cell is unprotected, a check mark appears beside **Unprotect** in the menu.

Circling Cells With Special Status

You can give special status to individual cells or to a range of cells by circling them on the spreadsheet. Cells have special status if they are:

- Protected.
- Invisible.
- Involved in a circular reference.
- Related to cells that have been cut or copied to the Clipboard.
- Related to the currently selected cells.
- Blank and referred to by a formula, or contain a formula with missing data.

Cells with special status do not look any different on the spreadsheet than normal cells. Circling them makes it possible to identify them when you look at the spreadsheet.

Options for Circling Cells

Circle Invisible Cells Circles invisible cells. The cells still appear blank, but now have a circle around them.

Circle Cells Involved in a Move Circles cells that relate to a cell or range of cells that has been cut or copied to the Clipboard. Cells that relate to cut or copied cells are circled while the cut or copied information is on the Clipboard so that you can evaluate the effect of the move before completing it.

Circle Missing Data Check the results of formulas on a spreadsheet by choosing **Circle missing data**. Cells are circled if they are used in the calculation of a formula and have been inadvertently left blank or mistyped.

When you click this option, a cell is circled if:

- It is blank and a formula refers to it.
- At least one of the cells its entry refers to is blank.

When you enter a value in a circled cell that is blank, the circle disappears when the spreadsheet is recalculated. A cell containing a formula remains circled as long as any of the cells to which the formula refers are blank or contain incorrect data. When the cells the formula refers to are properly filled in and the spreadsheet is recalculated, the circles disappear.

Functions and Text Values LisaCalc circles cells that contain text values if certain functions refer to those cells. To find out which functions this applies to, see the individual function descriptions in Chapter 3 (the description of the function includes "counts text values as zero"). When one of these functions refers to a cell that contains text, the function counts the text value as if it were a zero. If the function refers to a range of cells, and a cell in the range contains a text value, LisaCalc circles the cell.

This is useful to help you find mistyped numbers. For example, if you type the lower case letter *l* instead of the number *1*, the entry in the cell is a text value, not a number value. If one of the functions that treats text values as zeros refers to this cell, **Circle Missing Data** circles the cell.

Circle Protected Cells Circles all the cells you have protected. Since protected cells do not appear different from unprotected cells, circling makes them easy to identify.

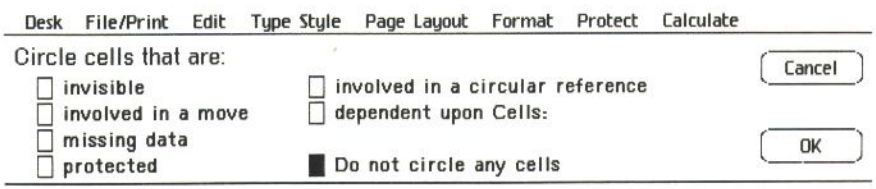
Circle Cells Involved in a Circular Reference Circles cells containing a circular reference. A circular reference is a formula that refers to the cell containing that formula. For example, the formula A2 + 12 is a direct circular reference if it is entered in cell A2.

Circle Cells Dependent on a Selection Circles all the cells that depend on the currently selected cell. This option is useful in showing relationships between cells. For example, you can see which cells would be affected if you were to cut a particular cell.

To Circle Special Status Cells:

1 ▸ Click the Deselect box at the upper left corner of the spreadsheet.

2 ▸ Open the **Calculate** menu and choose **Circle Cells**. The following dialog box appears. Check the circling option you want.



3 ▸ Click **OK** and LisaCalc circles the cells that meet the condition you chose. A message appears if no cells meet the specified condition.

Find Next Circled Cell

Selects the next circled cell on the spreadsheet. This option is only available while **Circle Cells** is in effect.

Find Next Circled Cell begins in the cell that is currently selected and searches in the row to the right of the selected cell. If it finds no circled cells in that row, it searches the row below, again from left to right. If the next circled cell is located on a part of the spreadsheet that is not visible on the screen, LisaCalc automatically scrolls the spreadsheet until the cell comes into view.

To Find the Next Circled Cell:

1 ▸ Click the Deselect box in the upper left corner of the spreadsheet.

2 ▸ Open the **Calculate** menu and choose **Find Next Circled Cell**. If **Find Next Circled Cell** appears on the menu in grey instead of black, choose **Circle Cells** first, and then repeat from step 1.

LisaCalc selects the first circled cell on the spreadsheet.

3 ▸ Continue repeating step 2 to select each circled cell.

Finding an Entry

You can find a particular value or formula anywhere on a spreadsheet with **Find What?** LisaCalc selects the first occurrence of the entry you specify, starting from the current cell. You can then edit, delete, or perform any other operation on the entry. This option is especially helpful on large spreadsheets where you have to scroll to see the entire spreadsheet.

You can find the next occurrence of the entry you specified by choosing **Find Next Occurrence**.

Find What?

LisaCalc gives you two choices when looking for an entry. You can **Look in Values** or **Look in Formulas**. Use these options to focus the search.

Look in Values This option searches cells that contain values; for example, cells containing numbers, text, or dates.

Look in Formulas This option searches cells that contain formulas. Use this option when the entry you are looking for is a formula or part of a formula.

You can have LisaCalc look in all cells by selecting both **Look in Values** and **Look in Formulas**.

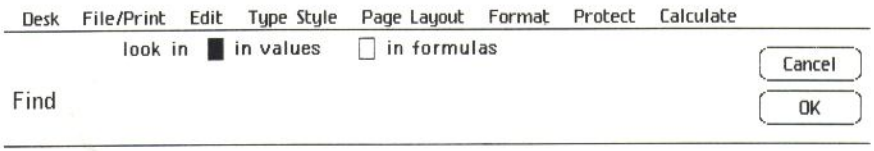
When you are looking for a number, LisaCalc doesn't require you to be exact about the format of the number you want to find. For example, a request to find the number 55 finds all occurrences of 55, such as $55.00, 55.00 or 55.

LisaCalc begins searching from the current cell. To search the entire spreadsheet, start with no cells selected.

To Find an Entry in the Spreadsheet:

1 ▸ Click in the Deselect box in the upper left corner of the spreadsheet.

2 ▸ Open the **Calculate** menu and choose **Find What?** The following dialog box appears. Type the entry you want to find, and check one or both boxes to search in cells containing values, formulas, or both.



3 ▸ Click OK.

The first cell containing the entry you searched for is selected.

Find Next Occurrence

This lets you find the next cell containing the entry you specified in **Find What?** LisaCalc selects the next cell that contains the specified entry, so you can quickly move to each occurrence of the value or formula. Like the **Find What?** option, LisaCalc only searches the area of the spreadsheet below the currently selected cell.

To Find the Next Occurrence of an Entry:

1 ▸ Open the **Calculate** menu and choose **Find Next Occurrence**.

LisaCalc selects the next cell containing the entry you are looking for.

If you have found the last entry, a message alerts you to this.

Changing the Appearance of a Spreadsheet

You can change the appearance of a spreadsheet in any of the following ways:

- Change the alignment of entries so that they appear on the left, right, or center of the cell.
- Change the style of a number so that it is displayed in a different format.
- Fill cells with the repetition of a symbol, such as a dash.
- Change the style of the print used to print the spreadsheet.
- Change the type size used to display the spreadsheet on the screen.

- Adjust the column width to make a column wider or narrower.
- Display the results of formulas in cells, or display the formulas themselves.

Changing the appearance of a spreadsheet does not change the information contained in the spreadsheet; it only affects how the information is displayed.

All the procedures for changing the appearance of a spreadsheet are described on the following pages.

Aligning Entries in Cells

When you align values, you choose where the values appear in the cells. There are four options for aligning values in cells:

- Words Left/Numbers Right.
- Left Flush.
- Center.
- Right Flush.

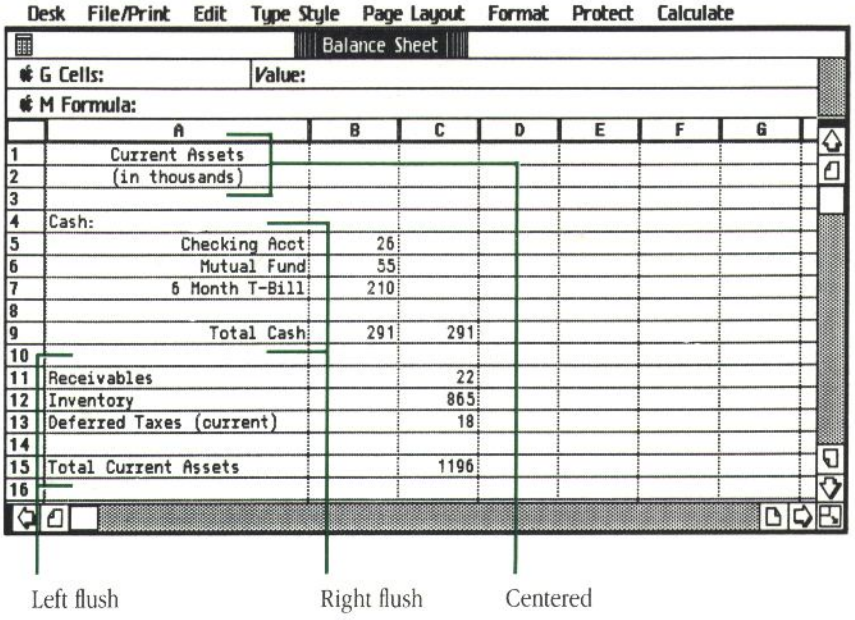
Words Left/Numbers Right Aligns text or date values on the left side of a cell, and number values on the right. It remains in effect for all cells until you choose another alignment option.

Alignment Choices

Left Flush Aligns all values on the left side of the cell.

Center Aligns all values in the center of the cell.

Right Flush Aligns all values on the right side of the cell.



You can choose an alignment option for a cell before or after you enter a value in the cell. If you choose an alignment option before entering a value, LisaCalc automatically aligns the value as soon as you enter it. If you choose an alignment option after entering a value, LisaCalc redisplays the cell in the new alignment.

Alignment of Cut or Cleared Cells

LisaCalc remembers which alignment option you have chosen for a cell or group of cells, even if you cut or clear the values in the cells. If you later enter new values in these cells, LisaCalc automatically aligns them according to the option you chose. To see which alignment option has been chosen for a selected cell, open the **Format** menu. A check mark appears next to the option in effect for the cell.

To Align Values in Cells:

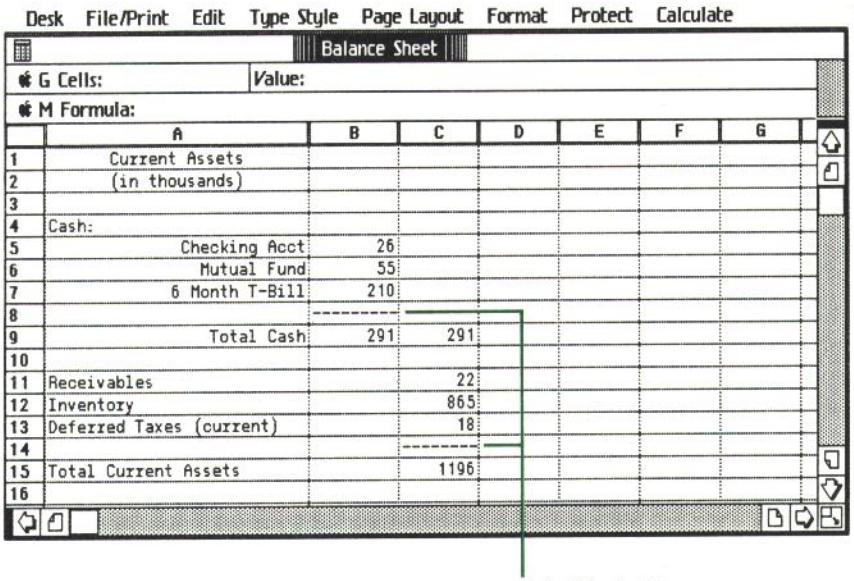
1 ▸ Select the cell or range of cells you want to align.

2 ▸ Open the **Format** menu, and choose one of the following: **Words Left/ Numbers Right**, **Left Flush**, **Center**, **Right Flush**. If you need help, see the last figure.

The values in the selected cells are aligned accordingly.

Filling a Cell with a Pattern

A pattern is the repetition of the same symbol or character in a cell. You can type the symbol once and let LisaCalc fill the cell with the pattern. For example, you might want to fill a cell with dashes to signify totals in the cell below, or you could fill a row of cells to draw a dividing line between two parts of the spreadsheet.



Cells filled with a pattern

To Fill a Cell with a Pattern:

1 ▸ Select the cell you want to fill.

2 ▸ Type the symbol you want to use (for example, dash, period, or equal sign) and press Enter.

3 ▸ Open the **Format** menu and choose **Fill Pattern**.

4 ▸ Deselect the cell by clicking once in the Deselect box.

The cell is filled with the pattern.

5 ▸ If you want to fill more than one cell with this pattern, copy the pattern into the other cells as described below.

a. Select the cell that contains the pattern.

b. Open the **Edit** menu and choose **Copy**.

c. Select the cell or cells that you want to copy the pattern into.

d. Open the **Edit** menu and choose **Paste**.

Changing the Number Style of Entries

By choosing a number style, you can change how a number looks. For example, you can display a number as a dollar figure, or you can round off a long decimal number to display it with a single decimal place.

Changing the number style doesn't change the value of the number as it is used in calculations. For example, if you enter 2.368 and select the number style that displays only two decimal places, 2.37 would be displayed in the cell and 2.368 would be used in calculations. You can see the number as it is used in calculations by selecting the cell.

There are two kinds of number styles:

- Number styles, for numbers other than dollars and cents.
- Monetary styles, for dollar and cent figures.

The best style to choose depends on the kind of figures you are entering on the spreadsheet, and on the space available for each column. Sometimes one number style makes a number too long to fit in a cell, given the current column width. When a number is too long to fit in the cell, LisaCalc displays a line of asterisks in the cell. You can either widen the column to accommodate the number in the style you chose, or choose another style that is more compact. For information on widening columns, see Changing Column Width.

When to Choose a Number Style

You can choose a number style before or after you enter a number in the cell. If you choose the style first, LisaCalc automatically displays the number you enter in the chosen style. If you enter the number and then choose a number style, LisaCalc redisplays the number in the new style.

LisaCalc remembers which number style you have chosen for a cell or a group of cells, even if you cut or clear the numbers in the cells. If you later enter new numbers in these cells, LisaCalc automatically displays them in the style you chose.

Number Styles

LisaCalc has four number styles to choose from:

- Floating Decimal.
- No Decimal.
- Fixed Decimal.
- Scientific.

Floating Decimal displays a number with as many decimal places as will fit in the cell, given the current column width. Since the number of decimal places can vary from cell to cell, the decimal points in a column of numbers may not line up.

Floating Decimal rounds off numbers and drops place-holders as necessary to make the numbers fit in the cell. Zeros at the end of a decimal number are always dropped. For example, Floating Decimal displays the number 5.890 as 5.89. If the cell is too narrow to display a three-digit number, LisaCalc will display the number as 5.9 or even as 6.

Floating Decimal is in effect for all cells until you choose another number style.

No Decimal rounds off decimals to the nearest whole number, so that all number values are displayed as whole numbers. For example, No Decimal displays the number 5.9 as 6.

Fixed Decimal allows you to choose how many decimal places will appear in the number. For example, Fixed Decimal with two decimal places displays the number 5.8976 as 5.90.

Scientific Style displays numbers in a special abbreviated notation, usually used for very large or very small numbers. Numbers are displayed as decimals raised to some factor of ten. For example, Scientific style with two decimal places displays the number 589,000 as 5.89E + 5.

To Choose a Number Style:

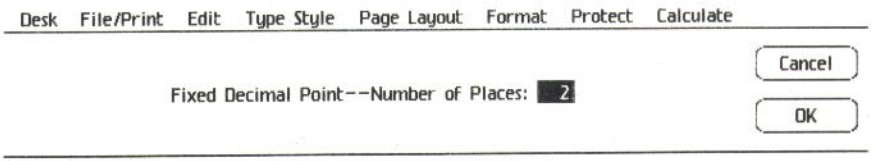
1 ▶ Select the cell or the group of cells you want to appear in one style. If you need help, see Selecting Parts of a Spreadsheet.

2 ▶ Open the **Format** menu and choose the number style you want to use.

The selected cell flickers and remains selected. While the cell is selected, you will not see the number displayed in the new style.

3 ▶ If you have chosen **Fixed Decimal** or **Scientific** style, a dialog box appears, allowing you to choose the number of places that will appear to the right of the decimal point.

Type the number of decimal places you want, then click **OK**.



4 ▶ To display the number in the style you have chosen, click once in the Deselect Box or select a different cell.

The number in the cell appears in the style you have chosen.

If a line of asterisks (****) appears in the cell, the style you chose makes the number too long to fit in the cell. Either choose a more compact style or widen the column (see Changing Column Width).

Monetary Styles

You can display a number in a variety of dollar and cents formats. The monetary styles are:

$1,234.56	Dollar sign, comma, cents
1,234.56	Comma, cents, no dollar sign
$1234.56	Dollar sign, cents, no comma
1234.56	Cents only
$1,235	Dollar sign, comma, rounded to the whole dollar
1,235	Comma only, rounded to the whole dollar
$ 1235	Dollar sign only, no comma, rounded to the whole dollar
1235	Numbers only, rounded to the full number

Monetary styles have certain features which cannot be changed. First, dollar amounts are indented one space to the left in cells. You cannot center a dollar amount, or choose any other alignment options that are available for ordinary numbers. Second, negative dollar amounts appear in cells with parentheses around them, not preceded by a minus sign.

To Choose a Monetary Number Style:

1▸ Select the cell or the group of cells you want to appear in one style. If you need help, see Selecting Parts of a Spreadsheet.

2▸ Open the **Format** menu and choose the sample dollar format that looks the way you want your figure to look.

The selected cell flickers and remains selected. While the cell is selected, you will not see the number displayed in the monetary style.

3▸ To display the number in the style you have chosen, click in the Deselect Box or select a different cell.

The number in the cell appears in the style you have chosen.

If a line of asterisks (****) appears in the cell, the style you chose makes the number too long to fit in the cell. Either choose a more compact style or widen the column (see Changing Column Width).

Changing Column Width

All columns are eight characters wide when you first create the spreadsheet. You can make the columns narrower or wider at any time. The maximum column width is 80 characters.

Changing the width of a column does not alter the values entered in the cells, but it does affect how much of the value appears in each cell. LisaCalc displays as much of the value as will fit in a cell, given the current column width. If the entire value does not appear in the cell, it appears in the Value Area of the Status Panel when the cell is selected. You can widen the column to display the entire value in the cell itself.

If you have chosen a number style that makes a number too long to fit in the cell, LisaCalc displays asterisks (****) in the cell. When this happens, you can either widen the column or choose a more compact number style so that the number will fit.

The longest number you can display by widening a column is 22 characters with a maximum of 15 decimal places. If the number is longer than this, it is automatically displayed in Scientific number style, regardless of the width of the column. For more information on number styles, see Changing the Number Style.

There are two methods for changing column width:

- Change columns one at a time.
- Change several columns at once.

To Change the Width of One Column:

1 ▸ Move the cross-hair pointer to the grid handle.

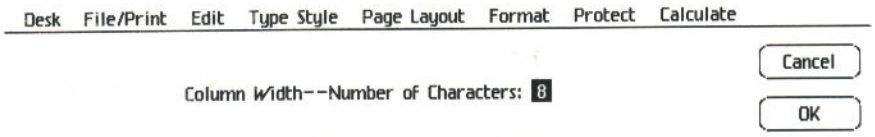
2 ▸ Press and drag to the right to make the column wider, or to the left to make the column narrower.

3 ▸ When the column is the width you want, release the mouse button.

To Change the Width of Several Columns at Once:

1 ▶ Select the columns you want to change. If you need help, see Selecting Parts of a Spreadsheet.

2 ▶ Open the **Page Layout** menu and choose **Column Widths**. The column width dialog box is displayed.



3 ▶ In the space provided, type a number between 1 and 80 to indicate how many characters wide you want the columns to be.

4 ▶ Click OK.

The dialog box disappears and the selected columns are adjusted to the new width.

Changing Printing Type Style

Type style refers to the kind of characters used to print your spreadsheet. You can choose Modern or Classic type in a variety of sizes. Modern and Classic are the names of the type styles. The size of type is measured in pitch and point size. Pitch refers to the number of characters that can be printed horizontally per inch; for example, 10-pitch type prints ten characters per inch. Point size refers to the height of a printed character — the larger the point size, the larger the character. There are 72 points per inch, so a 12-point character is about 1/6 inch high.

Samples of the Modern and Classic type styles in all available sizes are shown below.

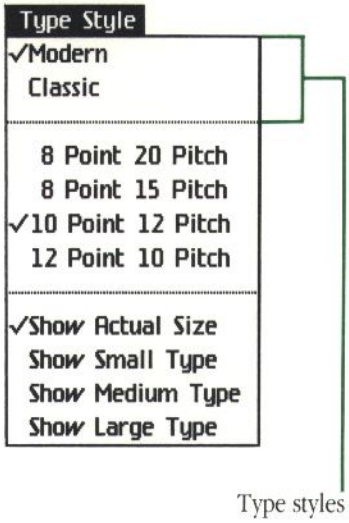
```
8 Point 20 Pitch
8 Point 15 Pitch
10 Point 12 Pitch        10 Point 12 Pitch
12 Point  10 Pitch       12 Point  10 Pitch
```

One type style is used for the entire spreadsheet; you cannot use different type styles in different parts of the spreadsheet.

You can print the spreadsheet in one type style while displaying it on the screen in another. For example, you may want to print a spreadsheet in 20-pitch type so that more fits on a printed page, but display the spreadsheet on the screen in large type so that it is easier to read and work on. To see the spreadsheet on the screen exactly as it will look when printed, the screen type size must be Actual Size. For more information, see Changing Screen Type Size.

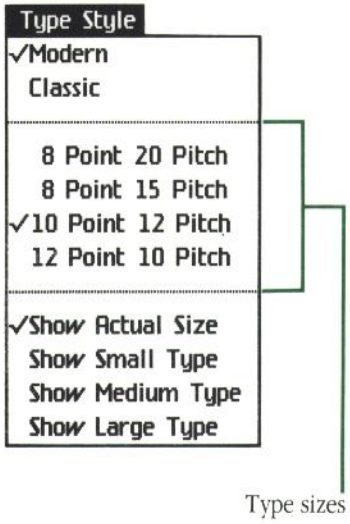
To Change the Printing Type Style:

1 ▸ Open the **Type Style** menu and choose either **Modern** or **Classic** if you want to change from one to the other.



2 ▸ Open the **Type Style** menu and choose the point size and pitch you want to use.

The type style you choose will now be used to print the spreadsheet.



Changing Screen Type Size

Type size refers to the size of characters used to display your spreadsheet on the screen. You can display the spreadsheet in large type to make it easier to read, or you can display it in small type to fit more information on the screen. The entire spreadsheet is displayed in one screen type size; you cannot display portions of the spreadsheet in different sizes.

The type size displayed on the screen is independent of any printing type style you have chosen. You can display any of the type styles in any of the screen type sizes. The screen type size does not affect how the spreadsheet looks when it is printed. For more information, see Changing Printing Type Style.

There are four type sizes to choose from. Samples of these are shown here.

```
Actual size
Small type
Medium type
Large type
```

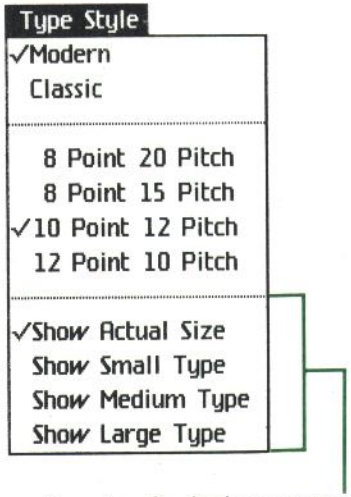
To Change Screen Type Size:

1 ▸ Open the **Type Style** menu and choose the type size you want.

LisaCalc then displays the spreadsheet using the new type size.

Showing Formulas or Values

LisaCalc lets you display the results of formulas in cells, or display the formulas themselves.



Type sizes for display on screen

Show Values Only displays values you enter in cells, and the results of formulas. This option is in effect when you create a spreadsheet.

Formulas and Values displays values you enter in cells, the results of formulas, and the formulas themselves.

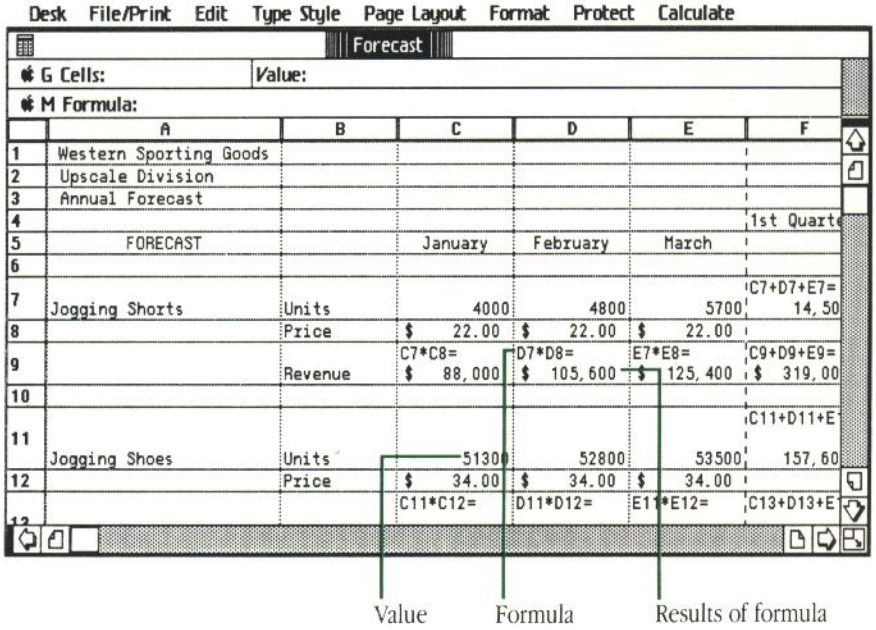
Show Values Only is the usual way of displaying and working on a spreadsheet. While **Show Values Only** is in effect, cells on the spreadsheet display:

- Values you enter in cells.
- Results of formulas.

To see a formula for a particular cell while **Show Values Only** is in effect, select the cell and the formula appears in the Formula Area of the Status Panel.

While **Show Formulas and Values** is in effect, cells on the spreadsheet display:

- Values you enter in the cells.
- Results of formulas.
- The formulas themselves.



You cannot edit the contents of cells while **Show Formulas and Values** is in effect, but you can change the appearance of the spreadsheet (such as change number style or type style), file the spreadsheet, or print it.

The primary function of **Show Formulas and Values** is for record keeping. It allows you to print a copy of the spreadsheet which records the location of formulas, and shows how the value in each cell was calculated. This is useful when you have a spreadsheet that you will refer to frequently, or if you would like to use the spreadsheet as a model for others you plan to create.

A second function of **Show Formulas and Values** is to help you check the spreadsheet for errors in formulas. You can examine a number of formulas at the same time and check which cells they refer to.

To Show Only Values, or Formulas and Values in Cells:

1 ▶ Open the **Calculate** menu and choose **Show Values Only** or **Show Formulas and Values**.

If you are not sure which one suits your needs, see Showing Formulas or Values.

If you chose **Show Formulas and Values** and the formulas are hard to read, you can widen the columns or choose a smaller type size. See Changing Column Width or Changing Printing Type Size.

Making Entries Invisible

LisaCalc lets you make specified entries invisible. Entries you make invisible are like protected cells, but with the added feature of not being displayed on the screen or appearing on the printed spreadsheet.

For more information on Protected cells, see Protecting Entries from Change.

Making entries invisible is useful when you don't want to see the entry in a cell, such as in the intermediate steps of a calculation.

You can make any number of entries invisible, from a single entry to an entire column, row, or range of cells.

When cells are invisible, they don't look any different from cells that are blank. To quickly see which cells on the spreadsheet are invisible, use the **Circle Invisible Cells** option of the **Circle Cells** item on the **Calculate** menu. When you choose this option, the cells are still invisible and look blank, but LisaCalc circles the cells you have made invisible.

To see the contents of an invisible cell, select the cell. You can view the contents of a single invisible cell in this way, but you cannot see the contents of a row, column, or range of invisible cells in this way.

While **Show Formulas and Values** is in effect, the invisible status of cells is temporarily removed; when you return to **Show Values Only**, cells you made invisible will again be invisible on the screen and on the printed spreadsheet.

You can make invisible entries visible again at any time. The contents of the selected cells then appear on the screen and on the printed spreadsheet. The cell entries appear and function as they did before you made them invisible, except for their alignment. Now all entries are aligned with numbers to the right of the cell and words to the left.

To Make Entries Invisible or Visible Again:

1 ▸ Select the cell, row, column, or range of cells you want to make invisible or visible.

2 ▸ Open the **Protect** menu and choose **Invisible** or **Visible**.

Splitting the View of a Spreadsheet

Splitting the view gives you two separate views of the same spreadsheet at once. When you split the view, each view has its own view controls and can be scrolled separately. In this way, you can compare parts of the spreadsheet that would normally be too far apart to appear together on the screen. For information on scrolling, see Working with Two Parts of a document at Once in the *Lisa Office System* manual. You can work on cells in either view by selecting cells in the usual way.

You can split the view in the following ways.

- Horizontally between rows.
- Vertically between columns.
- Both horizontally and vertically at once.

In addition, you can split the view as many times as you like, both horizontally and vertically.

The example below shows the normal, unsplit view of a spreadsheet.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Forecast

G Cells: Value:

M Formula:

	A	B	C	D	E	F	
1	Western Sporting Goods						
2	Upscale Division						
3	Annual Forecast						
4						1st Quarter	
5	FORECAST		January	February	March		A
6							
7	Jogging Shorts	Units	4000	4800	5700	14,500	
8		Price	$ 22.00	$ 22.00	$ 22.00		$
9		Revenue	$ 88,000	$ 105,600	$ 125,400	$ 319,000	$ 1
10							
11	Jogging Shoes	Units	51300	52800	53500	157,600	
12		Price	$ 34.00	$ 34.00	$ 34.00		$
13		Revenue	$1,744,200	$1,795,200	$1,819,000	$5,358,400	$1,8
14							
15	Ace Bandages	Units	32000	32500	32900	97,400	
16		Price	$ 3.80	$ 3.80	$ 3.80		$
17		Revenue	$ 121,600	$ 123,500	$ 125,020	$ 370,120	$ 1
18							
19							

The following example shows the same spreadsheet split horizontally at row 10. The lower view has been scrolled up to bring rows 25 to 31 into view so that you can see both the forecast and actual sales figures for the first quarter.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Forecast

G Cells: Value:

M Formula:

	A	B	C	D	E	F	
1	Western Sporting Goods						
2	Upscale Division						
3	Annual Forecast						
4						1st Quarter	
5	FORECAST		January	February	March		A
6							
7	Jogging Shorts	Units	4000	4800	5700	14,500	
8		Price	$ 22.00	$ 22.00	$ 22.00		$
9		Revenue	$ 88,000	$ 105,600	$ 125,400	$ 319,000	$ 1
24							
25	ACTUALS						
26							
27	Jogging Shorts	Units	3757	4828	5865	14450	
28		Price	$ 22.00	$ 22.00	$ 22.00		
29		Revenue	$ 82,654	$ 106,216	$ 129,030	$ 317,900	
30		Variance	-.94	.58	2.9	.85	
31							
32							

The following example shows the spreadsheet with four vertical splits to produce five views. The leftmost view contains columns A and B which identify the products and breakdown of figures. The next four views have been scrolled so that each contains a column with a quarterly total. This makes it easy to compare the four quarterly forecasts.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Forecast

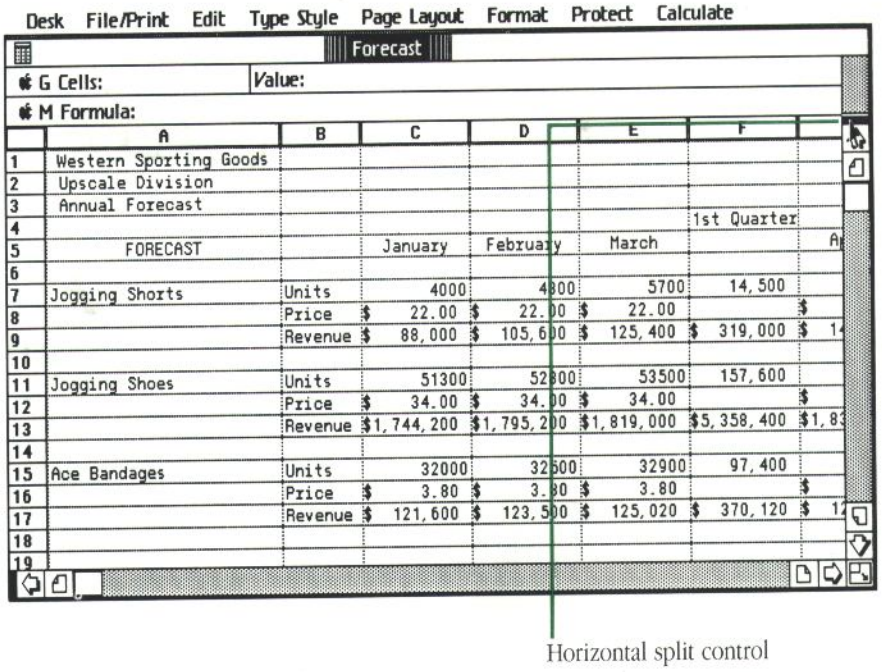
G Cells: Value:

M Formula:

	A	B	F	J	N	R
1	Western Sporting Goods					
2	Upscale Division					
3	Annual Forecast					
4			1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
5	FORECAST					
6						
7	Jogging Shorts	Units	14,500	23,100	31,700	29,000
8		Price				
9		Revenue	$ 319,000	$ 508,200	$ 697,400	$ 638,000
10						
11	Jogging Shoes	Units	157,600	167,000	176,000	173,000
12		Price				
13		Revenue	$5,358,400	$5,678,000	$5,984,000	$5,882,000
14						
15	Ace Bandages	Units	97,400	99,800	1,140,000	1,239,000
16		Price				
17		Revenue	$ 370,120	$ 379,240	$4,332,000	$4,708,200
18						
19						

To Split the View Horizontally between Rows:

1 ▸ Move the pointer to the horizontal split control in the upper right of the document window.



Horizontal split control

2 ▸ Press and drag to move the pointer down. A dotted horizontal line follows the pointer.

3 ▸ When the dotted line is where you want the screen to split, release the mouse button.

The screen is divided into two views, separated by a white line. An extra set of view controls appears in the side scroll bar.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Forecast

G Cells: Value:

M Formula:

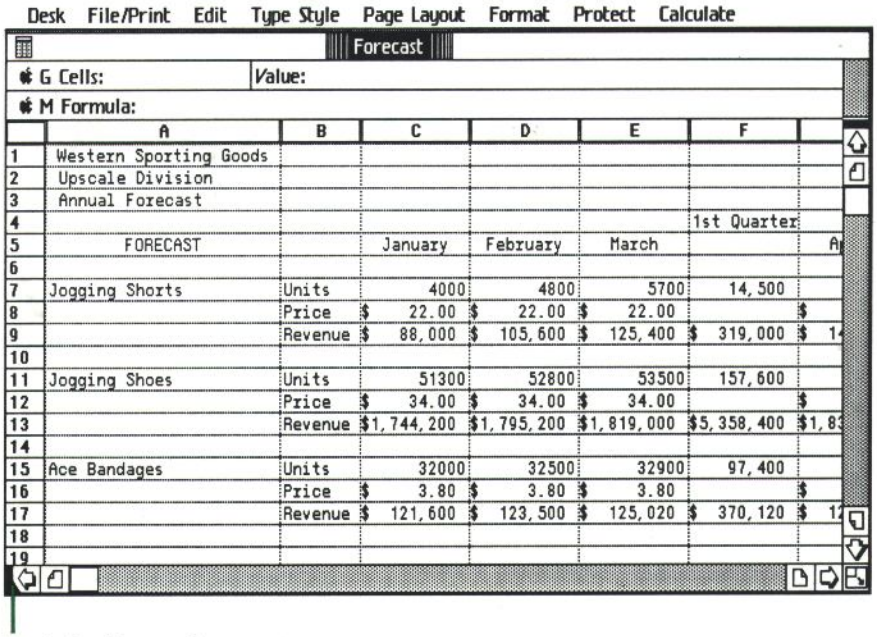
	A	B	C	D	E	F	
1	Western Sporting Goods						
2	Upscale Division						
3	Annual Forecast						
4						1st Quarter	
5	FORECAST		January	February	March		A
6							
7	Jogging Shorts	Units	4000	4800	5700	14,500	
8		Price	$ 22.00	$ 22.00	$ 22.00		$
9		Revenue	$ 88,000	$ 105,600	$ 125,400	$ 319,000	$ 1
10							
11	Jogging Shoes	Units	51300	52800	53500	157,600	
12		Price	$ 34.00	$ 34.00	$ 34.00		$
13		Revenue	$1,744,200	$1,795,200	$1,819,000	$5,358,400	$1,8
14							
15	Ace Bandages	Units	32000	32500	32900	97,400	
16		Price	$ 3.80	$ 3.80	$ 3.80		$
17		Revenue	$ 121,600	$ 123,500	$ 125,020	$ 370,120	$ 12
18							

4 ▸ Scroll the view until the rows you want appear on the screen. If you need help, see Viewing Hidden Portions of the Screen in the *Lisa Office System* manual.

You could now create multiple views, splitting the view horizontally again, or splitting it vertically by following the next procedure.

To Split the View Vertically between Columns:

1 ▸ Move the pointer to the vertical split control in the bottom left of the document window.



	A	B	C	D	E	F	
1	Western Sporting Goods						
2	Upscale Division						
3	Annual Forecast						
4						1st Quarter	
5	FORECAST		January	February	March		A
6							
7	Jogging Shorts	Units	4000	4800	5700	14,500	
8		Price	$ 22.00	$ 22.00	$ 22.00		$
9		Revenue	$ 88,000	$ 105,600	$ 125,400	$ 319,000	$ 1
10							
11	Jogging Shoes	Units	51300	52800	53500	157,600	
12		Price	$ 34.00	$ 34.00	$ 34.00		$
13		Revenue	$1,744,200	$1,795,200	$1,819,000	$5,358,400	$1,8
14							
15	Ace Bandages	Units	32000	32500	32900	97,400	
16		Price	$ 3.80	$ 3.80	$ 3.80		$
17		Revenue	$ 121,600	$ 123,500	$ 125,020	$ 370,120	$ 1
18							
19							

Vertical split control

2 ▸ Press and drag to move the pointer to the right. A dotted vertical line follows the pointer.

3 ▸ When the dotted line is where you want the screen to split, release the mouse button.

The screen is divided into two views, separated by a white line. An extra set of view controls appears in the bottom scroll bar.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Forecast

G Cells: Value:

M Formula:

	A	B	C	D	E	F
1	Western Sporting Goods					
2	Upscale Division					
3	Annual Forecast					
4						1st Quarter
5	FORECAST		January	February	March	
6						
7	Jogging Shorts	Units	4000	4800	5700	14,500
8		Price	$ 22.00	$ 22.00	$ 22.00	
9		Revenue	$ 88,000	$ 105,600	$ 125,400	$ 319,000
10						
11	Jogging Shoes	Units	51300	52800	53500	157,600
12		Price	$ 34.00	$ 34.00	$ 34.00	
13		Revenue	$1,744,200	$1,795,200	$1,819,000	$5,358,400
14						
15	Ace Bandages	Units	32000	32500	32900	97,400
16		Price	$ 3.80	$ 3.80	$ 3.80	
17		Revenue	$ 121,600	$ 123,500	$ 125,020	$ 370,120
18						
19						

4 ▸ Scroll the view until the columns you want appear on the screen. If you need help, see Chapter 2, Learning the Lisa, in the *Lisa Office System* manual.

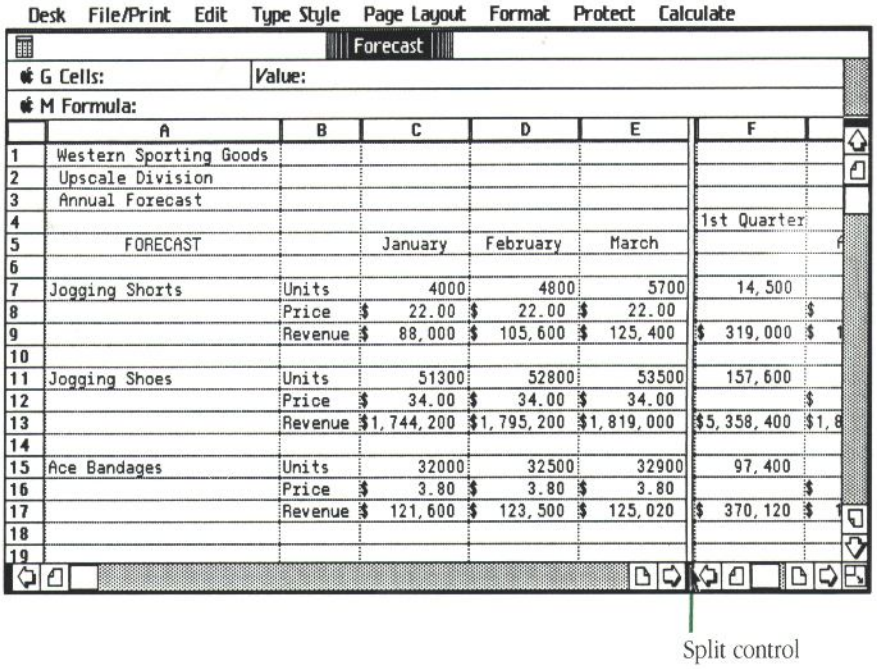
You could now create multiple views, splitting the view vertically again, or splitting it horizontally by following the previous procedure.

Closing a Split View

Use this option to put the spreadsheet back the way it was before you split the view.

To Close a Split View:

1 ▸ Move the pointer to the split control at the end of the white line dividing the views.



	A	B	C	D	E	F
1	Western Sporting Goods					
2	Upscale Division					
3	Annual Forecast					
4						1st Quarter
5	FORECAST		January	February	March	
6						
7	Jogging Shorts	Units	4000	4800	5700	14, 500
8		Price	$ 22.00	$ 22.00	$ 22.00	
9		Revenue	$ 88, 000	$ 105, 600	$ 125, 400	$ 319, 000
10						
11	Jogging Shoes	Units	51300	52800	53500	157, 600
12		Price	$ 34.00	$ 34.00	$ 34.00	
13		Revenue	$1, 744, 200	$1, 795, 200	$1, 819, 000	$5, 358, 400
14						
15	Ace Bandages	Units	32000	32500	32900	97, 400
16		Price	$ 3.80	$ 3.80	$ 3.80	
17		Revenue	$ 121, 600	$ 123, 500	$ 125, 020	$ 370, 120
18						
19						

2 ▸ If the view is split horizontally, press and drag to move the pointer down. If the view is split vertically, press and drag to the right.

The dotted line follows the pointer.

3 ▸ When the dotted line is at the edge of the screen, release the mouse button, and the view is no longer split.

Creating a Template

A template supplies you with a spreadsheet tailored for a commonly performed task. A template is a spreadsheet you set up with formulas and labels suitable for a particular task, and then re-use later to perform the same task with different figures. For instance, you could set up a template with the necessary labels and formulas to compute your monthly expenses, and then use it each month. Every month you would enter figures for that month without having to recreate the entire spreadsheet.

To Create a Template:

1 ▸ Create a spreadsheet for a specific task: for example, a spreadsheet for figuring this month's expenses. Include the figures for this particular month, the formulas, and the column and row labels you need.

When you enter the formulas, enter the coordinates of cells containing figures and not the figures themselves. Formulas used in templates must be written in this way so that you can change the values used in the formulas without changing the formulas themselves.

2 ▸ To make the spreadsheet into a template, you need to clear the cells containing the values for this particular spreadsheet, and save the cells containing formulas and labels.

The safest way to clear the values you don't want is to protect the cells that you want to keep and then clear the rest of the spreadsheet, as described below.

a. Select the cells you want to keep (cells containing formulas, constants used in formulas, and all labels).

b. Open the **Protect** menu and select **Protect Formulas and Values**.

Repeat the above two steps until you have protected all the cells that contain entries you want to keep.

c. Open the **Edit** menu and choose **Select All of Document**.

d. Open the **Edit** menu and choose **Clear**, or press Clear for the same result (the CLEAR key is at the top left of the numeric key pad).

You are left with a Template — a spreadsheet with formulas and labels but without figures specific to one case. The cells that contain formulas display zeros because the cells they refer to are blank, and blank cells are treated as zeros in LisaCalc formulas. If you now enter figures in the necessary cells, LisaCalc will calculate the results of the spreadsheet with the new figures.

To help you locate the blank cells that are referred to by formulas, click Missing Data in the **Circle Cells** option on the **Calculate** menu. Clicking on Missing Data circles all the blank cells referred to by formulas.

To use a template again and again, you need to make the template into a stationery pad. See Chapter 3 in the *Lisa Office System* manual.

Printing a Spreadsheet

The printing choices available with all Lisa applications are described in the *Lisa Office System* manual. On the following pages the printing choices specific to LisaCalc are described. These choices give greater control over the appearance of a spreadsheet on the printed page. You can:

- Print part of a spreadsheet.
- Print the grid lines (the horizontal and vertical lines that define the cells).
- Print row numbers and column letters.
- Print page numbers and headings.
- Prevent printing the constants *Error* and *Infinity*.
- Preview the way a large spreadsheet will print over several pages.
- Change the location of breaks between pages.

Printing Part of a Spreadsheet

LisaCalc allows you to print only part of the spreadsheet rather than the entire spreadsheet. You can use this printing option in conjunction with the other printing options.

Printing part of a spreadsheet is always available in LisaCalc, except when you are using **Show Formulas and Values** for the spreadsheet.

To Print Part of a Spreadsheet:

1 ▶ Select the part of the spreadsheet you want to print. If you need help, see Selecting Parts of a Spreadsheet.

2 ▶ Open the **File/Print** menu and choose **Print Current Selection**.

A message appears letting you know the information is being prepared for printing. After a pause, printing begins.

Printing Options

You might make a printed copy of the spreadsheet for a number of purposes: record keeping, analysis, presentation, or to find an error in the spreadsheet. In each case, you might want to vary the appearance of the printed copy. The printing options let you change the appearance of the printed spreadsheet by choosing whether or not to print the grid lines, row numbers and column letters, and page numbers and titles.

The printing options are:

- Print the matrix grid lines.
- Print the matrix row and column headings.
- Print headings.

Print the Matrix Grid Lines causes the spreadsheet's grid lines to be printed, except when you have **Show Formulas and Values** in effect. When **Show Formulas and Values** is in effect, grid lines are automatically printed and selecting this option prevents grid lines from being printed.

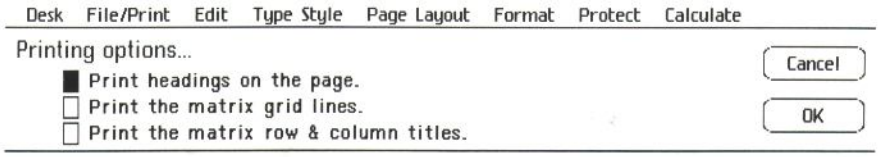
Print the Matrix Row and Column Headings causes the row numbers and column letters to be printed, except when **Show Formulas and Values** is in effect. When **Show Formulas and Values** is in effect, selecting this option prevents the row numbers and column letters from being printed.

Print Headings causes the page number and title to print on each page. Note that printing page numbers and titles leaves less room for other information on the page.

To Select a Printing Option:

1 ▶ Open the **Page Layout** menu and choose **Printing Options . . .**

2 ▶ A dialog box appears containing the printing options.



Check a box to select the option you'd like. If you need help, see Printing Options on the previous page.

3 ▶ Open the **File/Print** menu and choose **Print**. After a pause, your spreadsheet begins printing.

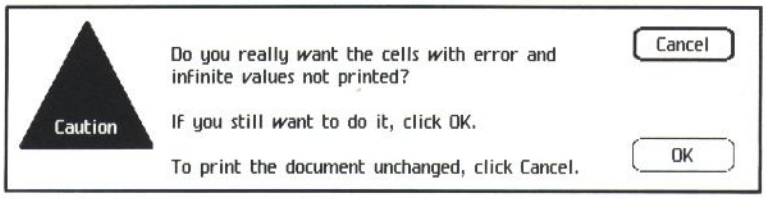
Printing *Error* and *Infinity*

The constants *Error* and *Infinity* appear in cells as the result of formulas that contain incomplete information. If you do not want the printed copy of the spreadsheet to include these constants, you can prevent LisaCalc from printing them. For complete information on all LisaCalc constants, see Constants in Chapter 3.

To Prevent *Error* or *Infinity* Printing in a Spreadsheet:

1 ▶ Simultaneously hold down the Option and Shift keys while you open the **File/Print** menu and choose one of the print options.

LisaCalc displays a message asking you to confirm that *Error* and *Infinity* should not be printed. Click OK to print the document without displaying *Infinity* or *Error*. Click Cancel to continue with normal printing.



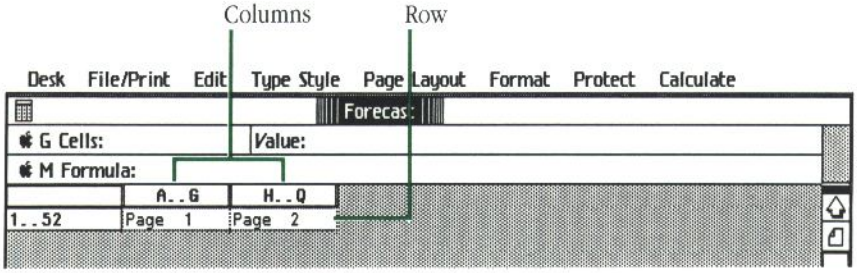
Previewing Pages for Printing

If your spreadsheet is too large to fit on one printed page, LisaCalc automatically prints it on several pages. You can preview the pages to see where the breaks between pages will occur. This option shows you the number of pages the spreadsheet requires and lists the range of cells that will appear on each printed page. If you don't like the arrangement of information on the page, you can go back to the spreadsheet and adjust it, or you can change the location of the page break (see Changing Page Breaks).

To Preview Pages before Printing:

1 ▸ Open the **Page Layout** menu and choose **Preview Pages**.

A table appears showing the page numbers and the range of cells that will appear on each page. In the example, the pages will break between columns G and H, and won't break between rows.

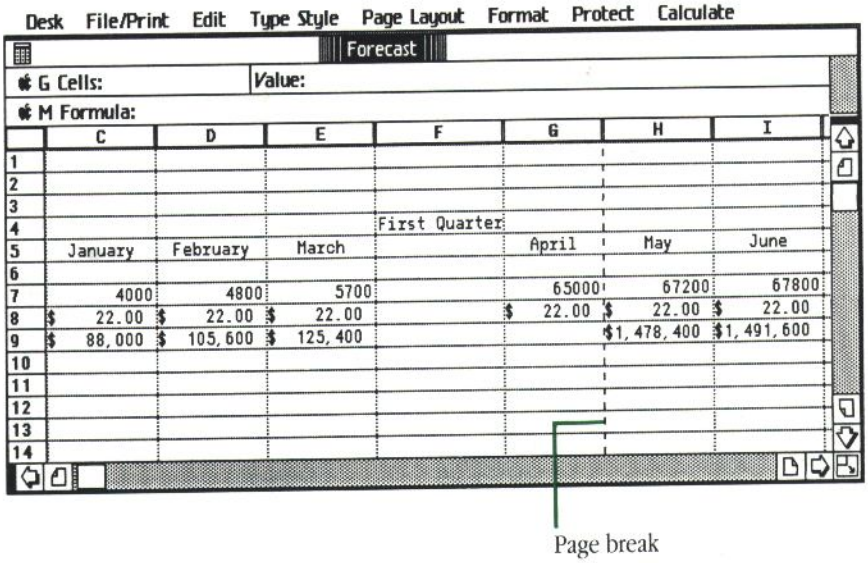


2 ▸ To return to the spreadsheet, open the **Page Layout** menu and choose **Don't Preview Pages**.

The spreadsheet is again displayed. If necessary, you can rearrange the information on the spreadsheet, or add or delete columns or rows, to make a more suitable printed copy.

Changing Page Breaks

Page breaks determine which columns and rows will appear on one printed page of the spreadsheet. LisaCalc sets automatic page breaks that appear as a dashed line between the columns or rows where the printed pages will break.



You can change the location of automatic page breaks by inserting your own page mark in another location. For example, insert a page mark between columns D and E to break the page between these columns. After you insert a page mark, LisaCalc sets another automatic page break in the appropriate location.

To Change the Location of a Page Break:

1 ▸ Select the location for a new page break by clicking once between two columns or rows.

2 ▸ Open the **Page Layout** menu and choose **Insert Page Mark**.

A dashed line shows where the pages will break.

To Remove a Page Break:

1 ▸ Select the page break you want to remove by clicking once between the columns or rows at the location of the page mark.

Select a range of rows or columns, or the whole document, to remove page breaks within that range.

2 ▸ Open the **Page Layout** menu and choose **Remove Page Mark**.

The dashed line disappears, indicating that the pages will no longer break there.

If you selected a range of cells, only the page breaks set automatically by LisaCalc remain in that range.

Using LisaCalc With Other Applications

After you have created a spreadsheet with LisaCalc, you can copy parts of the spreadsheet into documents created with other Lisa applications. You can also copy information from documents created with other Lisa applications into a LisaCalc spreadsheet.

You can use LisaCalc with:

- LisaGraph.
- LisaList.
- LisaWrite.
- LisaTerminal.
- LisaProject.

Using LisaCalc with any of these applications involves copying information from one document into another in the same way as you would copy information from one spreadsheet to another. If you are not familiar with the basic copying procedures, see Moving and Copying Information earlier in this chapter.

Copying Information into LisaCalc

When you copy information into LisaCalc from another application, you must paste into an area that is the same size or an exact multiple of the information you are pasting. For further information on pasting information in LisaCalc, see Moving and Copying Information earlier in this chapter.

When you are copying a range of cells, a convenient way to paste the cells into a spreadsheet is to select only the cell in the upper left corner of the range you are pasting into, and let LisaCalc paste into the remaining necessary cells.

If you try to paste into LisaCalc cells that are protected or invisible, a warning message appears. You can then cancel the operation or continue to paste into the cells.

Entries retain the cell alignment and number style they had in the document you copied them from, even if you had previously chosen a different alignment and number style for those cells in the spreadsheet. You can make any necessary changes to the alignment or number style after the entries have been pasted.

When you copy information into LisaCalc, the information is treated as a value, not a formula.

From LisaGraph and LisaList to LisaCalc

You can copy any part of a LisaList list or LisaGraph table into a LisaCalc spreadsheet:

- A single cell, row, or column.
- A range of cells, rows, or columns.
- An entire LisaList list or LisaGraph table.

You cannot copy the graph portion of a LisaGraph document into LisaCalc. Also, information you copy from LisaGraph cannot be treated as a formula in LisaCalc.

The LisaGraph table is the same number of columns and rows as the LisaCalc spreadsheet.

Pasting cells from a LisaList list or a LisaGraph table has the following results.

Column Width If the LisaGraph column was not wide enough to display the complete entry in a cell, only the part of the entry that was visible in the table is pasted into the spreadsheet. The complete entry from a LisaList field is always pasted into the spreadsheet, even if it was not completely visible in the list.

Alignment and Number Style Cells pasted into a LisaCalc document retain the cell alignment and number style given to them in LisaGraph.

Formulas and Data Types Any entries from LisaList that use the Number data type can be used in LisaCalc formulas. Entries that use any of the other data types display *Error* when used in a formula.

From LisaWrite to LisaCalc

If you have created a table in a LisaWrite document, you can copy any part of this table into a spreadsheet.

Pasting from a LisaWrite document into a LisaCalc spreadsheet has the following results.

Paragraphs LisaCalc treats each paragraph in a LisaWrite document as a row in the spreadsheet.

Tabstops LisaCalc treats each tabstop in a LisaWrite document as the beginning of a new column in a spreadsheet.

For example, LisaCalc regards a single LisaWrite paragraph containing three tabstops as one row containing three columns. If you copy more than one paragraph, the paragraph with the highest number of tabstops defines the number of columns. For example, if you copy two paragraphs — one with three tabstops and one with six — LisaCalc treats this as two rows, each containing six columns.

From LisaTerminal to LisaCalc

You can copy tabular information from LisaTerminal to LisaCalc. Whatever tabular material was transmitted from the host computer to the LisaTerminal document can be selected, copied, and pasted into a LisaCalc spreadsheet.

LisaCalc treats LisaTerminal paragraphs and tabstops in the same way as those in a LisaWrite document (see above).

From LisaProject to LisaCalc

The Cash Flow Table or Task Table can be copied from a LisaProject document and pasted into the LisaCalc spreadsheet.

To Copy Information from Other Applications to LisaCalc:

1▸ Select the part of the LisaGraph, LisaList, LisaProject, LisaWrite or LisaTerminal document that you want to copy.

2▸ Open the **Edit** menu and choose **Copy**.

The selected information is placed on the Clipboard.

▸▸▸

3 ▸ Open the spreadsheet into which you want to copy the information by double-clicking on its icon (you may need to rearrange objects on the desktop first).

4 ▸ Select a location in the spreadsheet for the copied information. (If you need help, see Moving and Copying Information.)

5 ▸ Open the **Edit** menu and choose **Paste**. If you want the information you are copying to be treated as a formula, simultaneously hold down the Shift and Option keys while you select **Paste**.

The information from the Clipboard is copied into the spreadsheet.

If LisaCalc finds an error when pasting the information, an alert message is displayed. You can then cancel the remainder of the operation or continue to paste.

Copying Information from LisaCalc

You can copy any part of a LisaCalc document into a LisaList, LisaGraph, LisaWrite, LisaProject, or LisaTerminal document. You can copy:

- A single cell, row, or column.
- A range of cells, rows, or columns.
- The entire spreadsheet.

When you paste into a LisaList or LisaGraph document, the area you paste into must be the same size or an exact multiple of the information you are pasting. For complete information on the LisaList and LisaGraph pasting rules, see the *LisaList* or *LisaGraph* manual.

If you copy LisaCalc formulas into documents created with other applications, the results of the formulas are normally copied, but not the formulas themselves. To copy the formulas themselves, you must simultaneously hold down the Shift and Option keys while choosing **Copy** from the **Edit** menu.

To LisaGraph from LisaCalc

Pasting information from LisaCalc into LisaGraph has the following results.

Labels and Numbers You must paste text and numbers in the appropriate columns in the LisaGraph table. Text pasted in Column A of the table becomes labels for the x-axis of the graph; numbers pasted in the same row as the labels are plotted on the graph above that label. The numbers are automatically plotted in the graph after pasting. Be sure to paste all the labels you need into Column A and all the numbers you want plotted into the other columns.

Note: If the *orientation* of the array of cells is incorrect (that is, labels in a *row*, with numeric information in *columns* beneath them) in the LisaCalc document you want to copy into LisaGraph, you can paste it in *as is*. After the paste is completed, you can transpose the rows and columns using **Cut** and **Paste** in LisaGraph. (See the LisaGraph manual for complete instructions.)

Alignment and Number Style Cells pasted into LisaGraph retain the LisaCalc cell alignment and number style.

Columns or Rows If the columns and rows from the spreadsheet are not arranged correctly for the LisaGraph table, you can transpose columns into rows and vice versa. See Transposing Rows and Columns under Moving and Copying Information in Chapter 2 of the *LisaGraph* manual.

Formulas Only the results of formulas can be copied into LisaGraph, not the formulas themselves.

To LisaList from LisaCalc

Pasting information from a LisaCalc spreadsheet into a LisaList list has the following results.

Number of Columns You must be sure there is enough space to accommodate all the columns you are pasting into LisaList. LisaList can add more rows to accommodate the new information but is limited to 100 columns, not all of the LisaCalc spreadsheet's 255 columns can be used.

Column Width If the LisaCalc column was not wide enough to display the complete entry in a cell, only the part of the entry that was visible on the spreadsheet is pasted into the list.

Alignment and Number Style LisaCalc cell alignment and number style are not preserved.

Cell Visibility If you copy invisible cells into a list, these cells remain invisible and appear blank in the list.

To LisaWrite from LisaCalc

Copying information from a LisaCalc spreadsheet to a LisaWrite document has the following results.

Paragraphs LisaWrite treats each row in the spreadsheet as a separate paragraph followed by a carriage return.

Tabstops LisaWrite inserts tabstops in front of each column from the spreadsheet, including the first column. Numbers are given flush right tabstops and text values are given flush left tabstops. After pasting the information, you can adjust the tabstops as necessary.

To LisaTerminal from LisaCalc

When you copy information from LisaCalc to LisaTerminal, LisaTerminal sends the information to the host computer just as if it had been typed directly into the LisaTerminal document. For more information on LisaTerminal, see the *LisaTerminal* manual.

To Copy Information into Other Lisa Applications:

1 ▸ Select the part of the spreadsheet you want to copy.

2 ▸ Open the **Edit** menu and choose **Copy**. If you want to copy LisaCalc formulas into the document (rather than the results of formulas), simultaneously hold down the Shift and Option keys while you choose **Copy**.

The selected information is placed on the Clipboard.

3 ▸ Open the document into which you want to copy the information by double-clicking on its icon (you may need to rearrange objects on the desktop first).

4 ▸ Select a location in the document for the copied information. (If you need help, see Moving and Copying Information.)

5 ▸ Open the **Edit** menu and choose **Paste**.

The information from the Clipboard is copied into the document.

Shortcuts and Alternatives

The information on the following pages describes shortcuts and alternative methods for performing LisaCalc operations. These alternatives have the same result as the methods described throughout the earlier part of this chapter. After becoming familiar with LisaCalc, you can choose whichever method you find most convenient.

Double-Clicking on Icons

Whenever you want to open a spreadsheet, you can double-click on icons rather than selecting icons and choosing from menus. You can do this to start a new spreadsheet or to open an existing spreadsheet.

To Start a New Spreadsheet:

1▸ Open the Disk by double-clicking on its icon.

2▸ Tear off a piece of LisaCalc stationery by double-clicking on the LisaCalc paper icon.

3▸ Type a name for the new spreadsheet.

4▸ Double-click on the new spreadsheet's icon to open the spreadsheet.

To Open an Existing Spreadsheet:

1▸ Open the Disk or Diskette by double-clicking on the icon.

2▸ If the spreadsheet is in a folder, double-click on the folder's icon to open the folder.

3▸ Double-click on the spreadsheet's icon to open the spreadsheet.

Selecting the Location for a Blank Row or Column

When you want to select a location to insert a blank row or column, you can type the coordinates of the grid handle in the Cells Area of the Status Panel instead of selecting the grid handle with the mouse.

To Select the Location for a Blank Row or Column:

1▸ Clear the contents of the Cells Area of the Status Panel.

2▸ Type the two row numbers or two column letters between which you want to insert a row or column, separated by a | (vertical bar). For example, 9 | 10 or C | D.

3▸ Press Enter.

4▸ Choose **Insert Blank Row or Column** from the **Edit** menu.

Editing in the Value Area

The value contained in a selected cell always appears in the Value Area of the Status Panel. You can edit a cell's value by typing in the Value Area instead of in the cell itself (formulas must always be edited in the Formula Area). Editing in the Value Area is necessary in some instances: for example, when asterisks appear in the cell instead of the number you typed.

To Edit an Entry in the Value Area:

1 ▶ Select the cell you want to edit.

2 ▶ Move the pointer to the Value Area of the Status Panel.

3 ▶ In the Value Area, select the part of the entry you want to replace or delete, or click to set an insertion point.

4 ▶ Change the entry or insert additional information in the usual way.

5 ▶ Press Enter to enter the new value on the spreadsheet.

Entering Formulas

You can enter cell coordinates in a formula by using the mouse instead of typing the coordinates. You can use this method to enter a single cell or a range of cells in a formula.

To Enter Cell Coordinates in a Formula:

1 ▶ Select the cell you want to contain the formula.

2 ▶ Click once in the Formula Area of the Status Panel.

3 ▶ Type the formula. When you want to enter cell coordinates in the formula, hold down the Option key (at lower left of the keyboard) while you select the cells.

The cell coordinates appear in the Formula Area of the Status Panel.

4 ▶ Finish entering the formula.

Apple Key

Some menu items and parts of the Status Panel are accompanied by an Apple symbol and a letter. This means that you can hold down the Apple key while typing the letter to choose a menu item or select part of the Status Panel, rather than using the mouse.

How to Use Apple Key Combinations

To Cut the Current Selection from the Spreadsheet	Hold down the Apple key and type *X*.
To Copy the Current Selection to the Clipboard	Hold down the Apple key and type *C*.
To Paste the Entries from the Clipboard into the Spreadsheet	Hold down the Apple key and type *V*.
To Center Entries in Their Cells	Hold down the Apple key and type *K*.
To Align Entries to the Left of Their Cells	Hold down the Apple key and type *L*.

How to Use Apple Key Combinations, continued

To Align Entries to the Right of Their Cells	Hold down the Apple key and type *R*.
To Select the Cells Area in the Status Panel	Hold down the Apple key and type *G*.
To Select the Formula Area of the Status Panel	Hold down the Apple key and type *M*.
To Select All of the Spreadsheet	Hold down the Apple key and type *A*.

Fixing Common Problems

The information on the following pages describes some common LisaCalc problems and solutions. If you experience problems with the Lisa itself, see the *Lisa 2 Owner's Guide.*

Entering Numbers

Problem

A line of asterisks (*****) appears in the cell when you enter a number.

Solution

The number is too long to fit in the cell. Widen the cell until it can hold the entire number, or change the number style to a more compact one.

Entering a Formula

Problem

When you enter a formula you see an alert message telling you the symbol you typed is not understood by LisaCalc.

Solution

You need to delete the highlighted symbol. Remember, commas are not acceptable in numbers. Also, you *must* use an asterisk for multiplication. For example, LisaCalc will show this alert message if you enter 3(4 + 5) instead of 3*(4 + 5). If you need help with writing your formula, see LisaCalc Formulas in Chapter 2 or Formulas in Chapter 3.

Problem

After entering a formula, ERROR is displayed in the cell that should contain the result.

Solution

Depending on the cause of the error, the solution is one of the following.

- If your formula contains a function (a predefined formula that performs a common calculation), you probably entered the wrong type of argument, or you entered too many or too few arguments for the function. See Function Descriptions in Chapter 3 for a description of functions and their arguments, along with a listing of the particular conditions that will cause an error in each function.

- Your formula, or one of the cells it refers to, contains an incompatible kind of value. For example, an arithmetic formula can only contain numbers and arithmetic symbols, not dates or relational symbols. Check your formula, and the cells it refers to, for incompatible values. If you need information on the various types of formulas and the values they use, see LisaCalc Formulas in Chapter 3.

  If you are working on a large spreadsheet, the easiest way to check the cells that a formula refers to is by using the **Circle Cells Dependent on a Selection** option of the **Circle Cells** item in the **Calculate** menu. This option circles all the cells that refer to the selected cell. For help in using Circle Cells, see Circling Cells with Special Status earlier in this chapter.

- Your formula contains a circular formula (one that refers back to its own result). You can find out if this is your problem by using the **Circle Cells Involved in a Circular Reference** option of the **Circle Cells** item in the **Calculate** menu. If this option doesn't circle any cells on your spreadsheet, a circular reference is not the cause of the error. If it does circle cells, you need to edit the spreadsheet to delete the circular reference.

- You cut an entry that the formula refers to and didn't paste the entry back into the spreadsheet from the Clipboard. If you can't paste the entry because it is no longer on the Clipboard, enter the value in a cell and edit the formula to reflect this change.

Problem

Your formula gives a result that you are sure is incorrect.

Solution

Check to see that the cells the formula refers to contain the values you want to use in the formula. It might be that a cell the formula refers to contains a blank when it should contain a value. (Formulas treat blank cells as zero.)

To check the cells that the formula refers to, use the **Circle Cells Dependent on**: option of the **Circle Cells** item in the **Calculate** menu. This option circles all the cells on the spreadsheet that refer to the selected cell.

Problem

After entering the formula, *Infinity* is displayed in the cell instead of the result.

Solution

LisaCalc displays *Infinity* as the result of division by zero. Find the part of the formula that divides by zero and change it.

Chapter 3

LisaCalc Reference

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Introduction

This chapter is an overview and summary of LisaCalc. It tells you about LisaCalc without emphasizing procedural instructions. Refer to Chapter 2 for complete step-by-step instructions on the tasks you can perform with LisaCalc.

Creating a Spreadsheet

You create a LisaCalc spreadsheet by selecting cells, entering information in the cells, and choosing menu items. The combination of these three steps allows you to accomplish specific results with LisaCalc.

The types of information you can enter in a LisaCalc spreadsheet are:

- Text values, which are usually labels on the spreadsheet; for example, *Profit, April, Subtotal*.
- Numbers; for example; 24, .089; 12,000.
- Dates; for example, 12/30/84.
- Date parts; for example, 40 days, 5 months, 3 years.
- Formulas, which are used to perform calculations; for example, 219 + 150, A1*12, D5 > D7

Changing a Spreadsheet

At any time, you can change labels, numbers, dates, or formulas in the spreadsheet. When you change formulas, or numbers used in a formula, LisaCalc automatically recalculates the results of the spreadsheet.

Besides changing the cell entries themselves, you can use the LisaCalc menus to add or delete rows or columns, or change the appearance of the spreadsheet in a variety of other ways: you can align entries left, right, or center in their cells, display numbers in various styles, or make cells invisible both on the screen and in a printed copy of the spreadsheet.

The LisaCalc menus also let you control the spreadsheet in other ways. For example, you can specify when LisaCalc should recalculate the spreadsheet, or prevent accidental changes being made to selected cell entries by protecting cells from change.

Any LisaCalc spreadsheet can be made into a template. A template is a spreadsheet with formulas and labels suitable for a particular task that is reused later for the same task but with different numbers.

Formulas

The three kinds of formulas used in a LisaCalc spreadsheet are:

- Arithmetic; for example, 500*92, C12 − 11.
- Date; for example, 4/9/84 + 14 months, 12 weeks + C9.
- Logical; for example, A15 >= 7weeks, D4 − 56 < F6*3.

Formulas can calculate simple arithmetic, such as adding several numbers or computing how many days a certain date is from today, or formulas can be combined with LisaCalc functions to calculate complex equations for statistical or numerical analysis. Formulas and functions are explained in detail later in this chapter.

Functions

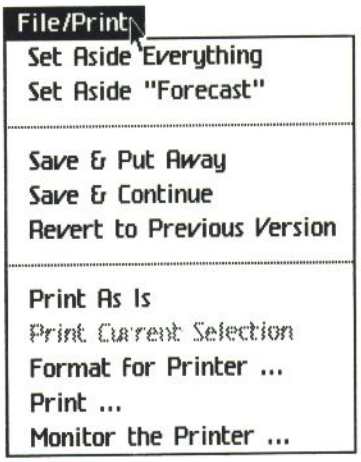
LisaCalc makes use of 37 functions. Each has its own particular formula into which you insert the values and/or coordinates from which you want to calculate a particular result. The functions are explained in detail at the end of this chapter with the types of values, results, and errors that pertain to each one.

About this Chapter

The LisaCalc menus, menu items, dialog boxes, and Apple keys are listed in the first part of this chapter. The second part describes LisaCalc constants and LisaCalc formulas. The last part lists the LisaCalc functions in alphabetical order and explains their use.

LisaCalc Menus

File/Print Menu



Set Aside Everything Returns all documents to their icons on the desktop without saving the contents.

Set Aside "Your Spreadsheet" Returns the current spreadsheet to its icon on the desktop without saving the contents.

Save and Put Away Saves the contents of the spreadsheet, and returns its icon to the original storage device.

Save and Continue Saves the contents of the spreadsheet and leaves it open.

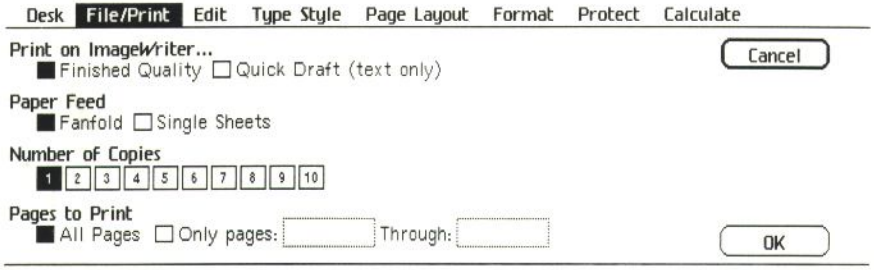
Revert to Previous Version Returns the spreadsheet to the version that existed when you last saved it.

Print As Is Prints the spreadsheet.

Print Current Selection Prints the currently selected portion of the spreadsheet.

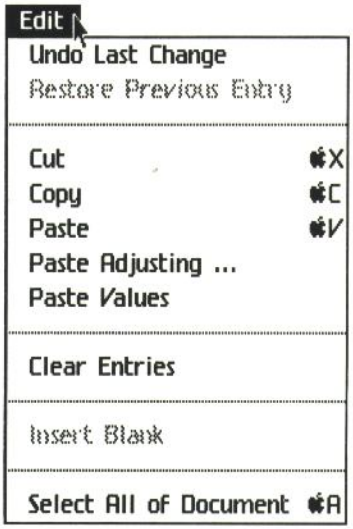
Format for Printer... Formats the spreadsheet based on the printer that will be used.

Print... Provides the following dialog box.



Monitor the Printer Shows the documents that are printing.

Edit Menu



Undo Last Change Returns the spreadsheet to the condition it was in before the last change.

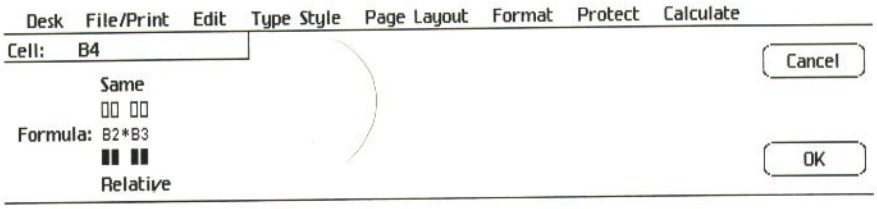
Restore Previous Entry Cancels all changes made to a single cell since it was selected.

Cut Cuts the current selection from the spreadsheet and places it on the Clipboard.

Copy Copies the current selection to the Clipboard.

Paste Pastes whatever is on the Clipboard into the spreadsheet at the current selection point.

Paste Adjusting Pastes formulas on the Clipboard into the spreadsheet at the current selection point and adjusts them relative to each cell. When you choose this menu item, the following dialog box appears.



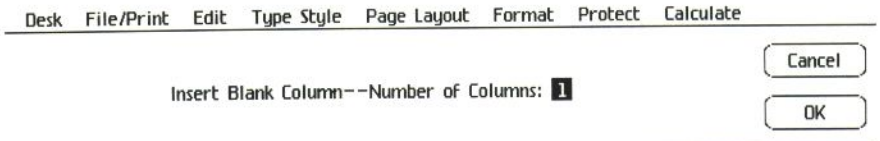
Same copies the cell coordinates without adjusting them for the new cells.

Relative adjusts the cell coordinates for each new cell.

Paste Values Pastes the results of the formulas on the Clipboard into the spreadsheet at the current selection point.

Clear Entries Clears the current selection from the spreadsheet.

Insert Blank Inserts blank columns or rows in the spreadsheet. When you choose this option, the following dialog box appears.



Enter the number of rows or columns you want to add and click **OK**.

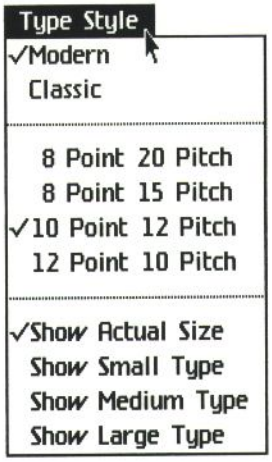
Select All of Document Selects the entire spreadsheet.

Type Style Menu

Modern/Classic Displays the spreadsheet in this type style.

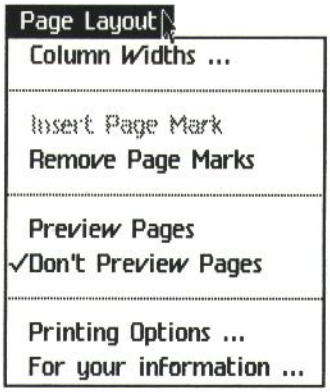
Point/Pitch Uses this print size and style.

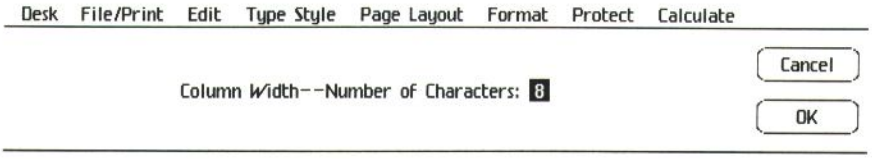
Actual/Small/Medium/Large Displays the spreadsheet on the screen in this type size.



Page Layout Menu

Column Widths Changes the width of several columns at once. When you select this option, the following dialog box appears.



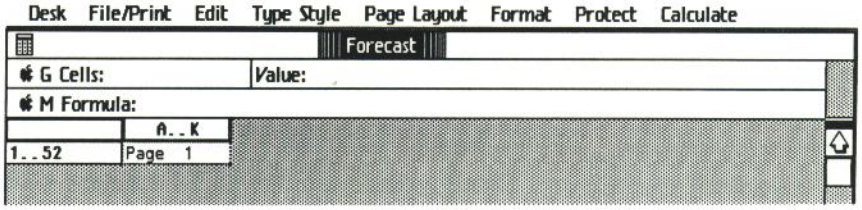


Enter the number of characters wide you want the columns to be and click OK.

Insert Page Mark Starts a new page at the insertion point.

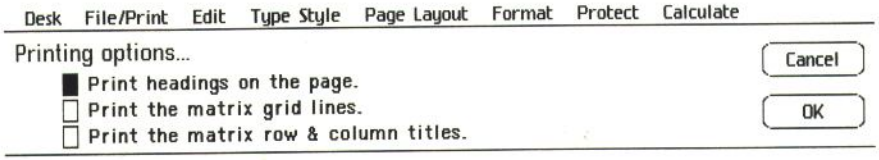
Remove Page Mark Removes the page mark at the insertion point.

Preview Pages Displays a table that shows you where pages will break on the printed spreadsheet. In the example, the pages will break between columns K and L, and won't break in the middle of columns.



Don't Preview Pages Returns the spreadsheet to the screen after you previewed pages.

Printing Options Displays the following dialog box from which you select printing options.



Print headings on the page prints page numbers and titles.

Print the matrix grid lines prints the lines that make rows and columns.

Print the matrix column and row titles prints the column letters and row numbers.

For Your Information Provides facts about your spreadsheet such as the speed and number of necessary passes for recalculation, and the number of bytes of memory needed for storage.

Format Menu

Words Left/Nos. Right Aligns the selected entries in their cells with words flush left and numbers flush right.

Left Flush Aligns the selected entries flush left in their cells.

Right Flush Aligns the selected entries flush right in their cells.

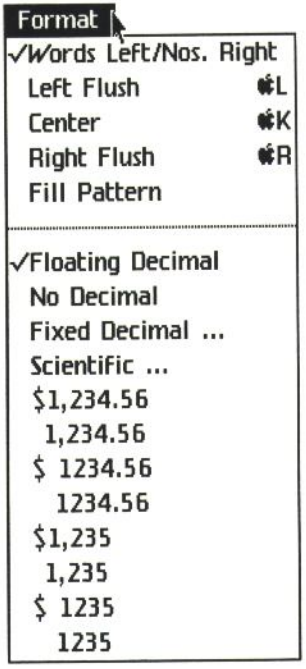
Center Centers entries in their cells.

Fill Pattern Fills the cell with the symbols or characters you typed before you selected this option.

Floating Decimal Displays numbers with as many decimal places as the cell width allows.

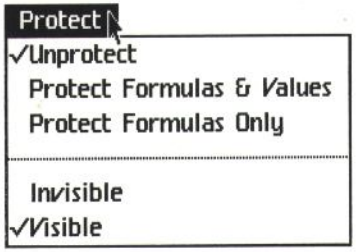
No Decimal Rounds the selected number to a whole number.

Scientific Displays selected numbers in scientific notation.



$1,234.56 through 1235 Eight different formats for displaying dollar amounts with a variety of choices for decimal point use, commas, and use of dollar sign.

Protect Menu



Unprotect Removes the protection status from the selected cells; you can now clear and edit the entries in these cells.

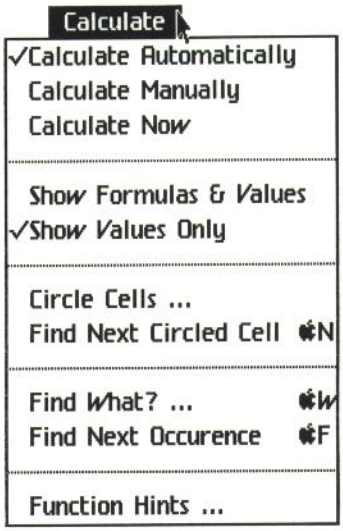
Protect Formulas and Values Prevents the selected cells from being cleared and values in them from being edited; you can edit the formulas in these cells.

Protect Formulas Only Prevents the selected cells containing formulas from being cleared or edited.

Invisible Makes the entries in the selected cells invisible both on the screen and in a printed copy, and makes them protected cells.

Visible Changes selected cells that are invisible back to being visible, both on the screen and in a printed copy.

Calculate Menu



Calculate Automatically Recalculates the spreadsheet each time you enter a value that is used in a formula.

Calculate Manually Recalculates the spreadsheet only when you select Calculate Now.

Calculate Now Recalculates the spreadsheet now; use this option when Calculate Manually is in effect.

Show Formulas and Values Displays the spreadsheet with the formulas themselves and their results in the cells.

Show Values Only Displays the spreadsheet with the results of formulas in the cells and not the formulas themselves; this is how the spreadsheet is displayed when you first create it.

Circle Cells Circles cells that meet a special condition. The choices for circling are presented in a dialog box.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Circle cells that are:

- ☐ invisible
- ☐ involved in a move
- ☐ missing data
- ☐ protected
- ☐ involved in a circular reference
- ☐ dependent upon Cells:
- ■ Do not circle any cells

Cancel

OK

Circle invisible cells circles cells that you've made invisible.

Circle protected cells circles cells that you've protected.

Circle missing data circles blank cells referred to by a formula, and circles cells containing formulas that refer to blank cells or cells containing an incorrect type of data for the formula.

Circle cells involved in a move circles cells that are related to the selection currently on the Clipboard.

Circle cells involved in a circular reference circles cells that refer to themselves, and cells that are indirectly related to a circular reference.

Circle cells dependent on selection circles cells that are involved with the currently selected cell.

Don't circle cells removes the circles from the cells that were affected by an earlier Circle Cells command.

Find Next Circled Cell Selects the next cell that is circled.

Find What?... Lets you specify a value or formula you want to find. The following dialog box appears, providing two choices for the types of entries to search.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

look in ■ in values ☐ in formulas

Find |

Cancel

OK

To search in values, check **Look in Values**. To search in formulas, check **Look in Formulas**. Check both boxes to search in cells containing either values or formulas.

Find Next Occurrence Selects the next occurrence of the entry you searched for with **Find What?**.

Function Hints Lists the LisaCalc functions with the name, type of arguments, and definition of each. Use the scroll arrows to bring all the functions into view.

Apple Key

Some menu items and parts of the Status Panel are accompanied by an Apple symbol and a letter. This means you can hold down the Apple key while typing the letter to choose a menu item or part of the Status Panel, rather than selecting it with the mouse.

The Apple key combinations and their uses are as follows.

[ ] [A]	Select All of Document
[ ] [C]	Copy
[ ] [G]	Select Cells Area
[ ] [K]	Center
[ ] [L]	Left Flush
[ ] [M]	Select Formula Area
[ ] [R]	Right Flush
[ ] [V]	Paste
[ ] [X]	Cut
[ ] [.]	Terminate

Formulas

A formula is a rule or equation which computes a value. When you enter a formula in a cell, LisaCalc calculates the result and displays it in the cell. You can use formulas to add a row of numbers, calculate the difference between two calendar dates, compare a series of values, and so forth.

The three basic kinds of formulas are:

- Arithmetic formulas.
- Date formulas.
- Logical formulas.

You can combine several formulas to create a complex formula. You can also incorporate functions into formulas. A list of functions and their use is provided under Functions later in this chapter.

All formulas consist of two parts: operators and operands. *Operands* are the values you are going to operate on, such as two numbers. *Operators* determine what you do to the operands, such as add or subtract. Operands and operators for the three different types of formulas vary.

The information on the following pages describes the three types of LisaCalc formulas, along with the operators and operands for each type. If you need help with entering formulas, see Entering Formulas in a Spreadsheet in Chapter 2.

Arithmetic Formulas

Arithmetic formulas perform addition, subtraction, multiplication, division, and exponentiation. Their operands and operators are as follows.

Arithmetic Operands and Operators

Arithmetic Operands are any of the following types of values.

Operand	Example
Number	58.6
Cell coordinate	B14
A formula within parentheses	(A7 + C7)
Function	Sqrt(N4 + 16.89)

Arithmetic Operators are any of the following symbols.

Operator	Meaning
+	Addition
–	Subtraction
*	Multiplication
/	Division
DIV	Integer division
REM	Remainder after integer division
^ (caret on the number 6 key)	Exponentiation

DIV Means integer division — like regular division except the result is always a whole number; any remainder is discarded.

Examples:

11 DIV 3 = 3

−11 DIV 3 = −3

REM The remainder after integer division.

Examples:

26 REM 5 = 1

32 REM −10 = 2

^ Means exponentiation, or "raise to the power".

Examples:

3^3 = 27

8^(−1/3) = .5

Examples of Arithmetic Formulas

In all the following examples, the cell coordinates are given these values:

C2 = 4

D5 = 10

Examples:

C2/2 = 2

25 DIV D5 = 2

(6^2)*C2 − 2 = 142

sqrt(C2 + 12)*2 = 8

14*9 = 126

(C2 − D5)REM −2 = 0

Rules for Using Arithmetic Formulas

1. When you use DIV and REM, you must type a space before and after their names. For example, 12 REM 7, not 12REM7

2. The order of evaluation for formulas containing more than one operator is:

First	^ (exponentiation)
Second	*, /, DIV, REM
Third	+, −

   Examples:

   2 + 3^2 = 11

   D5 REM 3 + 6 = 7

3. If a formula contains more than one operator from the same group, the operations are performed from left to right.

   Examples:

   32/8/2 = 2

   8 DIV C2*10 = 20

4. You can override the order of evaluation rules by enclosing in parentheses the operation you want evaluated first.

   Example:

   32/(8/2) = 8

Logical Formulas

Logical formulas compare values to see if they are the same or different, or to see if one is bigger or smaller. The result of a logical formula is either True or False.

The two kinds of logical formulas are:

- Relational formulas.
- Compound relational formulas.

Relational Formulas

Relational formulas compare values such as numbers, dates, date parts, or text values.

Relational Operands and Operators

Operand	Example
Number	67
Cell coordinate	G8
Label	"unit cost"
Date	"4/6/84"
Date part	7 months
A formula in parentheses	(A4 + 12)

Operator	Meaning
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
=	Equal to
<>	Not equal to

Examples of Relational Formulas

Formula	Value is True if	Value is False if
C1 <= D1	C1 is less than or equal to D1	C1 is greater than D1
Sum(A1:M2) <> 23	Sum(A1:M2) is not equal to 23	Sum(A1:M2) is equal to 23

Rules for Using Relational Formulas

1. If you use logical formulas in arithmetic formulas, True = 1 and False = 0.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Stock Analysis

G Cells: C6 | Value (Number): true

M Formula: B6+1 year<=date

	A		B	C	D	E
1	Stock/Shares		Purchase Date	Held a Year?	# of Stocks	
2					Held More Than	
3					a Year:	
4					3	
5	Fareast Miners	400	11/05/83	false		
6	Lincoln Electric	130	1/12/83	true		
7	Devlin Enviornmental	290	3/16/83	true		
8	Garrison Technology	100	7/29/83	false		
9	Hybrid Corp.	350	12/22/82	true		
10						

In the sample spreadsheet, a list of stock holdings is in column A and their purchase dates are in column B. The formulas in column D determine whether each stock has been held for longer than a year. The formulas result in a value of 1 for stocks that have been held more than a year, and 0 for stocks that have been held for less than a year. The function **sum**(C5:C9) adds the results of the formulas and thus determines how many of the stocks have been held longer than a year.

2. If the operands are labels, the only operators you can use are = or <>.

   Formula: "Unit Cost" = D6

   Result: True if D6 contains "Unit Cost", False if D6 contains anything else.

3. LisaCalc compares values based on the values stored in memory. Because it is not always possible to store decimal numbers precisely, two values that appear to be equal may be found to be unequal when they are compared.

4. You can use dates and date parts in relational formulas. For information, see Date Formulas later in this section.

Compound Relational Formulas

Compound relational formulas combine relational formulas with one of the logical operators, AND, OR, and NOT.

AND compares the results of two logical formulas. If both of the relational formulas are true, the result of the compound formula is True. If one of the relational formulas is false, or if both are false, the result of the compound formula is False.

OR compares the results of two logical formulas. If either one of the relational formulas is true, or if both are true, the result of the compound formula is True. If both relational formulas are false, the result of the compound formula is False.

NOT looks at the result of one logical formula. Essentially, the NOT formula gives you the opposite result of the relational formula. If the result of the relational formula is False, the result of the compound formula is True. If the result of the relational formula is True, the result of the compound formula is False.

Compound Relational Operands and Operators

Operand	Example
Relational formula	8 >= C1
Compound relational formula	8 >= C1 AND 10 < 12

Operator	Example	Result
AND	6 < 7 AND (25 − 2) < 25	True
OR	7 < 6 OR 25 > (25 + 2)	False
NOT	NOT 25 < (25 + 2)	False

Examples of Compound Relational Formulas

Formula	Result
Not C1 < 15 AND G5 = 100	True if C1 is greater than or equal to 15, and G5 = 100, otherwise False
D1 < 25 OR G6 = 25 OR H7 > 50	True if D1 is less than 25, or if G6 is equal to 25, or if H7 is less than 50

Rules for Using Compound Relational Formulas

1. When a formula contains more than one relational or compound relational operator, the order of evaluation of the operations is:

First	−, +, *, /, DIV, REM, ^(exponentiation), according to their order of evaluation
Second	<, >, <=, >=, =, <>
Third	NOT
Fourth	AND
Fifth	OR

Example	Result
2*3 = 6 AND K5 > 2 + 7	True if K5 > 9, otherwise False
10 REM 6 OR NOT J6 <> 100	True if J6 is not equal to 100, otherwise false

2. You can override the order of evaluation rules by enclosing in parentheses the operation you want evaluated first.

Example	Result
(A4 = 100 OR A4 < 0) AND A2 > 5	True if A4 is equal to 100 or A4 is less than zero, and A2 is greater than 5, otherwise False
A4 = 100 OR (A4 < 0 AND A2 > 5)	True if A4 is equal to 100, or if A4 is less than zero and A2 is greater than 5

Date Formulas

You use date formulas to perform calculations on dates and date parts. Date formulas let you determine how many days lie between two dates, or what the date was a certain number of weeks ago, or whether a project is behind or ahead of schedule.

Operands and Operators for Date Formulas

Operands for Date Formulas are of two kinds: Dates and Date Parts.

Date is a calendar date. When entering a date in a date formula, you must enclose the date in quotes. The quotes are also needed when you enter a date in a cell as a text value, but not when you enter it in a cell as a date value.

Date Part is a number of days, weeks, months, or years. A date part is written as a number followed by a calendar unit.

Operand	Example
Date	3/21/84 12/4/85
Date Part	12 years 7 months 3 weeks 8 days

Operators you can use in date formulas are of two kinds: arithmetic operators (−, +, *, /, DIV, REM, ^) or logical operators (<, >, <=, >=, <>, =).

Adding and Subtracting Dates and Date Parts

Use arithmetic operators to add or subtract dates and date parts when you want to know how many days lie between two dates, or what the date was 10 days ago, or what it will be 6 weeks from Friday.

Operator	Example
−	3 months − B14
+	"12/25/84" + 15 days

Examples of Date Formulas

Operation and Result	Examples
Date + Date Part = Date	"7/13/84" + 15 days = 7/28/84
	D10 + 15 days = 4/23/83 (where contents of D10 is 4/08/83)
Date − Date Part = Date	"1/25/84" − 1 year = 1/25/83
	B23 − 1 year = 10/24/84 (where contents of B23 is 10/24/85)
Date − Date = Date Part	"9/06/84" − "2/30/84" = 38 days
	C5 − B10 = 1043 days (where contents of B10 is 10/11/81)
Date Part + Date Part = Date Part	8 weeks + 12 days = 68 days
	E15 + 2 weeks = 35 days (where contents of Cell E15 is 3 weeks)
	Date + 12 days = 12 days from current date
Date Part − Date Part = Date Part	12 months − 6 weeks = 12 months − 42 days
	12 days − A21

Note: LisaCalc will automatically convert weeks to days in calculating a date formula, but will not convert months to days or weeks because the number of weeks and days in a month vary depending on the particular month.

Rules for Adding and Subtracting Date Formulas

1. If you use cell coordinates in a date formula, the cells you refer to must contain a date or date part.
2. If you type a date directly into the formula, you must put quotation marks around the date, otherwise LisaCalc interprets a date as a series of divisions. For example, if you type 12/4/84 in a formula, LisaCalc interprets it as 12 divided by 4 divided by 84.

3. When you enter a date directly in a cell, the quotation marks are not necessary. For example, if you enter 3/5/85 in a cell, it is treated as a date.

4. When you add weeks, LisaCalc automatically displays the result in the equivalent number of days. For example, the formula 3 weeks + 4 weeks returns the value 49 days. However, other units are not automatically converted. For example, if you enter the formula 1 month + 45 days, you get the result 1 month, 45 days and not 2 months 15 days.

Comparing Dates and Date Parts

You use *relational operators* in date formulas to learn whether one date is before or after another and whether two dates are equal or not equal. The result is either true or false.

Operator	Example	Result
>	C14 > "10/4/83"	True if the date in C14 is after 10/4/83, otherwise false
<	5/5/83 < 5/6/83	True
>=	C14 >= "10/4/83"	True if 10/4/83 is before or the same date as the date in C14, otherwise false
<=	C14 <= "10/4/83"	True if 10/4/83 is after or the same date as the date in C14, otherwise false
=	C14 = "10/4/83"	True if the date in C14 is 10/4/83, otherwise false

Two date parts are considered unequal if they are expressed in different units. For example, LisaCalc considers 60 days and 2 months unequal. The only exception to this rule is that a number of weeks is considered equal to the equivalent number of days. For example, 3 weeks equals 21 days.

Converting Date Parts

You can convert the units in a date part when you want the result of a date formula expressed in one type of a unit rather than another, for example days rather than months.

You convert a date unit by enclosing the date part or date formula in parentheses, followed by the unit you want to convert to.

Examples of Date Conversions

Conversion	Example	Result
Months to days	(1 month)days	30 days
Years to days	(1 year)days	365 days
Years to months	(1 year)months	12 months
Days to months	("12/25/81" − "1/1/81")months	11 months
Days to Years	(8 weeks + 310 days)years	1 year
Months to Years	(18 months − 6 months)years	1 year

Rules for Date Part Conversions

1. LisaCalc automatically converts weeks into days. For example, if you type 1 week, LisaCalc displays 7 days.
2. If a formula only contains date parts, LisaCalc combines the date parts that are expressed in the same units. For example, 7 months + 1 year*2 months = 1 year, 9 months.
3. The interpretation of a date part depends on the type of unit it is expressed in. In a formula of the form:

   Old Date + Date Part = New Date

   The date part is interpreted as follows:

   a. If the date part is a number of days, New Date is found by counting forward that many days from Old Date.

   b. If the date part is a number of weeks, it is converted to days when the formula is calculated, but shown as weeks in the formula.

c. If the date part is a number of months, that many months are added to the month part of Old Date. The year part is increased if necessary. The date part does not change unless leaving the date part the same would result in an illegal date.

d. If the date part is a number of years, New Date is the same date, except that the number of years is increased or decreased accordingly. An exception is February 29, in a non-leap year, which is changed to March 1.

LisaCalc Constants

Certain labels have a constant, special meaning in LisaCalc. The LisaCalc constants are:

- Date.
- Error.
- Infinity.
- Na.
- True and False.
- Pi.

Date

Date stands for the current date when entered in a formula (if you enter *Date* directly in a cell, it is simply the text value "Date"). When you enter *Date* as the complete formula for a cell, the current date is displayed in the cell. When you enter *Date* as part of a formula, the current date is substituted in the formula.

The value of *Date* does not automatically change with the passage of time. For example, if you enter *Date* as the formula for cell A1 on Monday, when you open the spreadsheet on Tuesday, cell A1 still displays Monday's date. To make the date in the cell current, choose **Calculate Now** from the **Calculate** menu. After LisaCalc recalculates the spreadsheet, the cell will show the current date.

You must set the Lisa calendar with the correct date in order for *Date* to function properly. See the *Lisa Office System* manual for help with setting the Lisa calendar.

Example

Date + 6 months = the date six months from today.

Error

Error is displayed as the result of a formula that LisaCalc cannot calculate. The actual cause of the error could be one of several, such as a circular reference or incorrect type of value in the formula. For possible causes of *Error* being displayed in a cell, see Fixing Common Problems in Chapter 2.

You can also use *Error* in a formula if you want to flag an error in a cell. When *Error* appears as an operand in a formula, the result of the formula is *Error*.

Example

If(B1>C1, A1, Error)

If B1 is greater than C1, the result is the value of A1, otherwise the result is *Error.*

Infinity

Infinity is the largest possible number value. Infinity is the result of a formula that you have written correctly, but that cannot be calculated because the number is outside of LisaCalc's range, or the number is undefined (such as division by zero). −*Infinity* is the negative number value with the largest magnitude.

Example

If(A1 = Infinity, "Overflow", "OK")

The result is Overflow if A1 contains Infinity, otherwise the result is OK.

Na

Not Available. This value is returned by several functions in particular instances. For example, the Search function returns Na if the value being looked up is not found. The instances when each function returns Na are described in the list of functions in this chapter, under Error Conditions.

You can use *Na* as the value of a cell if some information is not available yet and you don't want an error in the spreadsheet.

When Na appears as a value in a formula, the result of the formula is also Na.

Example

If the value of A1 is Na, and the formula in A2 is A1 + 1, the value of A2 is also Na.

True/False

Several LisaCalc functions have an optional Boolean argument. A Boolean argument (named after the English mathemetician George Boole) can only be True or False. Entering True has one effect on the function and entering False has another effect.

The brackets [ ] around the Boolean argument (or any argument) in the function's notation indicate that the argument is optional.

Example

With the modified internal rate of return function (Xrr), entering False brings the negative payments to the future and the positive payments to the present.

Xrr(D5:D17, −.7, .5, False)

Entering True in the same formula has the opposite effect on the payments: negative payments are brought to the present and positive payments are brought to the future.

Xrr(D5:D17, −.7, .5, True)

Pi

When used in a formula, *Pi* has the value 3.1415926... (the mathematical constant Pi); when entered directly in a cell, *Pi* has the text value "Pi".

Example

Cos(Pi) = −1

Functions

Functions are predefined formulas that perform common calculations. A function can either be a formula by itself or it can be a component of a longer formula. A function is written as:

Function name(Argument 1, Argument 2)

If you want a quick reminder of the name or arguments of a particular function, choose **Function Hints** from the **Calculate** menu.

Function Arguments

Functions vary in the number and type of arguments they require. The three types of arguments for functions are:

- A single value.
- A range of values.
- A list of values.

A Single Value

Any of the values used in LisaCalc: a number, a date or date part, a label, or the logical constants True and False. For example, each one of these is a single value: B27, 23.4, 3 months, "9/5/47", "Sales", True. When used as a value in an *arithmetic* calculation, a cell containing *True* is valued as 1 and a cell containing *False* is valued at zero; blank cells, labels, text are all valued at zero. When *logical formulas* or *date formulas* are calculated, the non-numerical values in cells are calculated as described in the particular function.

A Range of Values

A range of cells; for example, A14:B36 or D3:D7. Can also be a range containing a single cell, for example, J5:J5.

A List of Values

A list of values is a combination of values and ranges, separated by commas, or a single value or range. Any number of values and ranges is allowed. For example, B2:B30, G9,42.4 or C2:C9 or 1, 2, 3, 4.

In addition to a specified number and type of argument, functions require their arguments to contain specific types of values. For example, a certain function might require two arguments, each of which must be a range of values, and the range must contain numbers.

The types of values an argument can contain are:

Number	For example, 23, 4.5, $123.45.
Logical	True or False. When used as a number in a formula, True is equal to 1, and False is equal to 0.
Date	A calendar date. For example, "8/12/34".
Date part	A number of days, weeks, months, or years. For example, 1 day, 3 weeks, 8 months, 10 years.
Label	A word or phrase that doesn't fall into one of the above categories. For example, Sales, 23.A, Profits. A label is treated as a zero when the label is in a list of values.
Blank	An empty cell. When used as a number in a formula, a blank is equal to zero.

Function Descriptions

The LisaCalc functions are listed alphabetically on the following pages. Each function is listed with:

- Function abbreviation or name.
- Formula to use on screen.
- Types of values that can be used in the formula.
- Example of use.
- Error conditions.

Note: When you enter a function, LisaCalc will recognize it regardless of the capitalization you use, as long as you spell it correctly and use the correct format.

abs (Absolute)

Formula to Enter:

abs(Value)

Returns a positive value of the same magnitude as Value, whether Value is positive or negative. That is:

If Value >= 0, result = Value.

If Value < 0, result = −Value. (A negative of a negative results in a positive number. See Example.)

Type of Value: Positive or negative number.

Examples:

abs(3.2) = 3.2

abs(−3.2) = 3.2

Error Condition: Returns Error if Value is not a number.

acos (Arccosine)

Formula to Enter:

acos(Value)

Returns *arccosine* of Value in radians.

Type of Value: Number in the range of: −1 <= Value <= 1.

Example: To find the arccosine of .7071, enter *acos(.7071)*. The result is .7853982, or the arccosine of 45°.

Error Conditions: Returns Error if Value is not a number or is outside the range indicated.

Annuity

Formula to Enter:

Annuity(Interest Rate Per Period, Number of Periods)

Returns a number called the *annuity factor.* When this factor is multiplied by the return per period of an investment, the result is the present value of the annuity. The formula used for the calculation of the annuity factor is:

$(1 - (1 + \text{interest rate per period})^{-\text{number of periods}})/\text{interest rate per period}$

Example: Suppose you want to know how much your monthly payments would be on a 30-year mortgage for $100,000, if the interest rate were 15% for a year. This is 360 payments; the interest each month is 1.25%. The formula for this would be:

100000/Annuity(.15/12, 30*12)

The result is $1264.44.

Error Conditions: Annuity returns Error if value entered for interest rate is not a number or is less than or equal to −1, or if value entered for number of periods is not a number.

asin (Arcsine)

Formula to Enter:

asin(Value)

Returns *arcsine* of Value in radians.

−Pi/2 <= Result <= Pi/2.

Type of Value: Number in range of: −1 <= Value <= 1.

Example: To find the arcsine of .5, enter *asin(.5)*. The result is .5235988, or the arcsine of 30°.

Error Conditions: Asin returns Error if Value is not a number.

atan (Arctangent)

Formula to Enter:

atan(Value)

Returns *arctangent* of Value, in radians.

Type of Value: Number.

Example: To find the arctangent of 1.732, enter *atan(1.732).* The result is 1.0471198, or the arctangent of 60°.

Error Condition: Atan returns Error if Value is not a number.

Average

Formula to Enter:

Average(List)

Returns the *average* (mean) of the values in the list. This is equivalent to the sum of the values in the list divided by the number of values in the list. In computing the number of values in the list, LisaCalc includes labels, but omits blank cells. If any of the values is Na, the result of the function is Na.

Type of List: Any number of numbers, logical values, or labels.

Example: Average(14.2, True, 100) = 38.4

Error Conditions: Average returns Error if any of the values in the list are dates or date parts, or have the value Error. Blank cells are allowed and do not contribute to the result.

Compound

Formula to Enter:

Compound(Interest Rate Per Period, Number of Periods)

Returns the *compound interest factor,* which, when multiplied by the principal, yields the total compounded value of a debt or investment. The formula used for calculation is:

(1 + interest rate per period)+number of periods

Example: Suppose you have $75,000 invested at 18% a year, compounded monthly, and you want to find out how much you will have at the end of four years. This is 48 periods, at 1.5% interest per period. The formula for this would be:

75000*Compound(.18/12, 4*12)

The result is $153,260.87.

Error Conditions: Compound returns Error if value entered for interest rate is not a number, or is less than or equal to −1, or if value entered for number of periods is not a number.

Correlation

Formula to Enter:

Correlation(Source Range, Result Range)

Only used in conjunction with the *regression* function. Measures the strength of the relationship between two independent variables by computing the *correlation coefficients.* These coefficients describe the strength of the relationship between each pair of *independent variables.* The result of the function is the *determinant* of the *correlation matrix.*

The coefficients have values between −1 and +1. The closer a coefficient lies to +1 or −1, the stronger the relationship.

Source Range: Values entered must be numbers. This is the range containing the independent variables.

Result Range: Values entered must be numbers. This is the result range containing the correlation matrix. It must be a square table and have as many rows as there are columns in the Source Range.

Example: Correlation is used in conjunction with the regression function. If you reviewed the example given for the Regression function in this chapter, you might want to compute the correlation matrix for its source range. To do this, enter the correlation formula with the coordinates of the source range from that example, followed by a range for the correlation matrix. The formula you enter is:

Correlation(B3:B7, H6:I9)

Error Conditions: Correlation returns Error if the Source Range contains values other than numbers or if the Result Range is not a square table or doesn't have as many rows as there are columns in the Source Range .

Correlation returns Na if the Result Range contains protected cells or formulas.

cos
(Cosine)

Formula to Enter:

cos(Value)

Returns the *cosine* of Value.

Type of Value: Number, in radians.

Example: To find the cosine of .7853982, enter *cos(.7853982).* The result is .7071, or the cosine of 45°.

Error Condition: Cos returns Error if Value is not a number.

cosH
(Hyperbolic Cosine)

Formula to Enter:

cosH(Value)

Returns the *hyperbolic* value of the *cosine.*

Type of Value: Number.

Error Condition: Hyperbolic cosine returns Error if Value is not a number.

Count

Formula to Enter:

Count(List)

Count returns the *number of values* in the list. It does not count blank cells. If you've entered blank spaces in the cell, the cell is not considered blank by the Count function.

Type of List: Any number and any type of values.

Example: To count the number of values in a list, enter *Count(A1:A7)*, where A1 is the first cell in the List and A7 is the last cell in the List.

Error Conditions: None.

Det (Determinant)

Formula to Enter:

Det(Range)

Computes the *determinant value* of a range of numbers. The range must be a square array of cells, that is, the selection must have the same number of rows and columns.

Type of Range: Number.

Example: Det(A2:C4)

G Cells: A1			Value [Number]: -21		
M Formula: Det(A2:C4)					
	A	B	C	D	E	F
1	-21					
2	1	2	3			
3	6	5	4			
4	0	2	7			
5						
6						

Error Condition: Returns Error if the Range does not have an equal number of rows and columns.

exp (Exponentiation)

Formula to Enter:

exp(Value)

Returns the *exponentiation* of Value, which is e^ Value.

Type of Value: Number.

Examples:

exp(1) = 2.718281828459

exp(−1) = .36787944117144

Error Conditions: Exp returns Error if Value is not a number.

If (If...Then...Else)

Formula to Enter:

If(Boolean Argument, Result for True, Result for False)

In the formula *If(X, Y, Z)*, if X is True, then Y is the answer returned. If X is False, then Z is the answer returned. X must be a logical formula. Y can be any type of value. Z can be any type of value.

Examples:

If(A1<27, B1, C1)

The result is the value in cell B1 if the value in cell A1 is less than 27, otherwise the result is the value in cell C1.

If(A1<2 AND B1<2, Min(C1:C8), Max(C1:C8))

If the values in cells A1 *and* B1 are both less than 2, the result is the smallest value in C1:C8, otherwise the result is the largest value in C1:C8.

Error Conditions: Returns Error if value entered for Boolean Argument is not a logical formula, or if Boolean Argument is True *and* Result for True is Error, or if Boolean Argument is False *and* Result for False is Error.

Index

Formula to Enter:

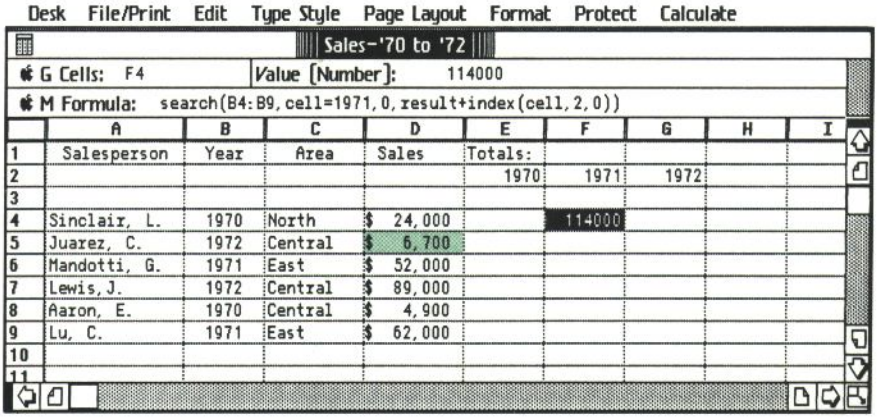
Index(Range, Number of Columns Offset, Number of Rows Offset)

The *index* function lets you treat a range (one or more cells) as a table, and locate and perform operations on entries in that table. It is useful in conjunction with the Search function and the constants that are peculiar to the Search function — Cell and Result.

Type of Range: Cell coordinates, or the constant, *Cell*. The range could contain the coordinates of a single cell.

Number of Columns Offset: Must be entered as a whole number.

Number of Rows Offset: Must be entered as a whole number.



	A	B	C	D	E	F	G	H	I
1	Salesperson	Year	Area	Sales	Totals:				
2					1970	1971	1972		
3									
4	Sinclair, L.	1970	North	$ 24,000		114000			
5	Juarez, C.	1972	Central	$ 6,700					
6	Mandotti, G.	1971	East	$ 52,000					
7	Lewis, J.	1972	Central	$ 89,000					
8	Aaron, E.	1970	Central	$ 4,900					
9	Lu, C.	1971	East	$ 62,000					
10									
11									

Examples: In the spreadsheet above, find the cell in the range of cells between B4 and D9 that is two columns over and one row down from B4, enter the formula:

Index(B4:D9, 2, 1)

The result of the formula is $6,700, the value of cell D5.

To find a cell anywhere, not just within a range as in the above example, use a coordinate instead of a range.

You can use the Index function with the Search function and the constant, Cell. Suppose you want to find total 1971 sales for everyone listed in the example. The formula is:

Search(B4:B9, Cell = 1971, 0, Result + Index(Cell, 2, 0))

LisaCalc searches through the range, and for every value equal to 1971, adds the value of the cell located two columns over and in the same row, to a total.

Error Conditions: Returns Error if Range is not cell coordinates or the value Cell. Returns Error if the values entered for the number of row and column offsets aren't numbers. Returns Na if Range is a range of cells and the located value is not within that range.

Int (Integer)

Formula to Enter:

Int(Value to Round, [Decimal Position])

Returns the truncated value of the Value to be Rounded; that is, deletes some of its decimal places. If the [optional] Decimal Position value is a positive number, that number of decimal places display in the result.

If value entered for Decimal Position is negative, that number of digits to the left of the decimal point goes to zero.

If the Decimal Position value is not a whole number, it is rounded to the nearest whole number.

If Value to be Rounded is a simple date part, *Int* returns the number of units (days, months, or years) without the name of the units.

Value to Round: must be a number or simple date part.

Decimal Position Value: Must be a whole number. Its use in this function is optional.

Examples:

Int(4.23) = 4

Int(4.23, 0) = 4

Int(1.234567, 3) = 1.234

Int(−1.234567, 3) = −1.234

Int(1234, − 2) = 1200

Int(1.234567, − 3) = 0

Int(14 months) = 14

Int(1 year + 2 months) = Error

Error Conditions: Int returns Error if Value to Round is not a number or a simple date part, or if value entered for Decimal Position is not a number.

Irr (Internal Rate of Return)

Formula to Enter:

Irr(Range of Payments)

Computes the *internal rate of return,* that is, the interest rate that equates the present value of all cash flows with an initial investment. Internal rate of return is also called the yield or discount rate. One of the payments can be negative. If more than one of the payments is negative, use the Xrr function explained in this chapter.

Range of Payments: Each value in the Range must be a number or blank cell. Contains the cash flows, one payment per cell. The formula assumes that each cell in this Range represents an evenly spaced payment period. If the payments are spaced at irregular intervals, insert blank cells in the range to make the periods even.

Example: Suppose you invested $20,000 in a gold mining venture last year. This year you received a $400 payment on it, and you expect to receive double that next year and triple that the next. If this trend continues for six years when you will recoup your $20,000 investment, what will be the internal rate of return on your initial investment?

To find out, enter these cash flows into range C5:C11, −20000, 400, 800, 1200, 1600, 2000, 20000. Now enter the formula:

Irr(C5:C12)

The internal rate of return is 4.9%

Error Conditions: Irr returns Error if Range doesn't contain numbers. Irr returns Na if more than one of the cash flows is negative, indicating the Xrr function must be used for the equation.

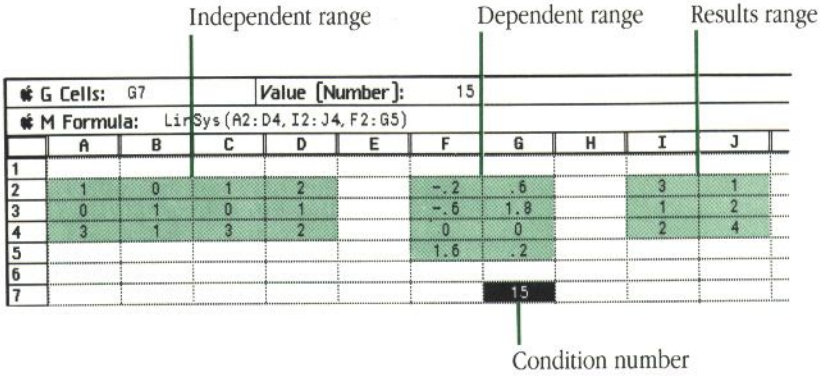
LinSys (System of Linear Equations)

Formula to Enter:

LinSys(Independent Range, Dependent Range, Results Range)

Describes the relationship between one or more dependent variables and independent variables by solving a *system of linear equations.*

LinSys(A, B, X) solves the matrix equation A*X = B, by treating the ranges A, B, and X as matrices. When you define the ranges for the equation, the number of rows in B must match the number of rows in A, the number of rows in X must match the number of columns in A, and the number of columns in X must match the number of columns in B.



	A	B	C	D	E	F	G	H	I	J
1										
2	1	0	1	2		-.2	.6		3	1
3	0	1	0	1		-.6	1.8		1	2
4	3	1	3	2		0	0		2	4
5						1.6	.2			
6										
7							15			

The *condition number* is returned in the cell in which you entered the formula. A condition number measures the reliability of the answers given in the Results Range. An *ill-conditioned* system of linear equations is one where small changes to the values in the Independent Range cause large changes in the Results Range. The condition number reports this reliability as an integer between zero and 15, corresponding roughly to the number of significant digits being accurate in the largest component in the Results Range. That is, the larger the condition number, the more reliable the results of the LinSys function.

Independent Range: Values entered must be numbers.

Dependent Range: Values entered must be numbers. Number of rows in this range must correspond to the number of rows in the Independent Range.

Results Range: Contains the correlation coefficients. Number of rows set up in this range must correspond to the number of columns in the Independent Range, and the number of columns in it must correspond to the number of columns in the Dependent Range.

Error Conditions: LinSys returns Error if the values in the source ranges are not numbers, or if the matrices for any of the ranges are not set up with the proper number of rows and columns.

Ln (Natural Logarithm)

Formula to Enter:

Ln(Value)

Returns the *natural logarithm* of Value. This is the logarithm to the base e.

Type of Value: Positive number.

Examples:

Ln(2.7182818284591) = 1

Ln(2) = .69314718055995

Ln(10) = 2.302585092994

Error Conditions: Ln returns Error if Value is not a positive number.

Ln returns Infinity if Value equals zero.

log (Logarithm)

Formula to Enter:

log(Value)

Returns the *logarithm* of Value to the base 10.

Type of Value: Positive number.

Examples:

log(2.7182818284591) = .43429448190326

log(2) = .30102999566398

log(10) = 1

Error Conditions: Log returns Error if Value is not a positive number. Log returns Infinity if Value equals zero.

Lookup

Formula to Enter:

Lookup(Value, Lookup Range, [Result Range])

This function *looks up* items in the Lookup Range that match Value. When a match is found, the corresponding entry in the Result Range, counting one-for-one, is returned as the result of the function.

Type of Value: Any type of value except a date part. If Value is a label, you must enclose it in quotation marks, unless it is a single word.

Lookup Range: Any type of values, but must be compatible with Value.

Result Range: Any type of values. Result Range is optional; if it is omitted, the column or row next to the Lookup Range is treated as the Result Range. Result Range and Lookup Range should have the same number of cells, but one can be part of a row while the other is part of a column.

If Value is a number and is not matched, but a value exceeding it is found, then the entry immediately before the value that exceeds Value is returned as the result of the function.

If the Lookup Range contains more than one column or row, the range is examined by columns from top to bottom.

If Value is a date or number, the function assumes that the Lookup Range is arranged in ascending numerical sequence. If it is not in sequence, the function stops looking for values as soon as it finds a value out of sequence.

If Value is a label, it must be enclosed in quotation marks, unless it is a single word. If labels are in Result Range, they do not have to be in any particular order (as numbers do), and uppercase letters and lowercase letters won't prevent a match.

Example: Suppose you have been figuring your income tax for the year. Your taxable income comes to $28,000 and now you need the marginal tax rate for this figure. If the tax tables are entered in two ranges, income in range C4:C76 and the corresponding taxes in range D4:D76, the formula you enter is:

Lookup(28000, C4:C76, D4:D76)

Your marginal tax appears in the selected cell.

Error Conditions: If Value is a label, it must be matched exactly in Lookup Range, or the function returns Na. If Value is a number or date, it

must fall between the first and last values in Lookup Range, or the result of the fuction is Na. If Result Range is smaller than Lookup Range, then whenever a value is found in Lookup Range in a cell for which there is no corresponding value in Result Range, the function returns Na.

Max (Maximum)

Formula to Enter:

Max(List)

Returns the largest, or *maximum*, value in the list. If List is a list of dates, Max returns the latest date. Labels are equal to zero.

Type of List Values: Numbers, logical values, labels, or dates. Dates cannot be mixed with any of the other types of values.

Examples:

Max(1.2, 15, 3) = 30

Max("1/9/87", "2/4/93", "3/15/72") = 2/4/93

Max(False, .3, .4, True, .7) = True

Error Conditions: Max returns Error if the items in List are not of compatible types, or if any item in the list has the value Error. Max returns Na if any item in the list has the value Na.

Min (Minimum)

Formula to Enter:

Min(List)

Returns the smallest, or *minimum*, value in the list. If List is a list of dates, Min returns the earliest date. Labels have the value zero.

Type of List Values: Numbers, logical values, labels, or dates. Dates cannot be mixed with any of the other types.

Examples:

Min(1.2, −200,3) = −200

Min("1/9/87", "2/4/93", "3/15/72") = 3/15/72

Min(False, .3, .4, True, .7) = False

Error Conditions: Min returns Error if the items in List are not of compatible types, or if any item in the list has the value Error. Min returns Na if any item in the list has the value Na.

Nfv
(Net Future Value)

Formula to Enter:

Nfv
(Discount Rate, Cash Flows)

Returns the *Net future value* of a series of payments. Blank cells in a series of payments are treated as zero payments.

Example: If you opened an individual retirement account this year with a $1,200 initial contribution, paying 12% per year, what will the net value of your account be in five years if you increase your yearly contributions by 10% a year?

To find out, enter these cash flows into range F6:F11: 1200, 1320, 1452, 1597, 1757. Now enter the formula:

Nfv(.12, F6:F11)

The result is $9,108.76.

Error Condition: Value and Range must be numbers.

Npv
(Net Present Value)

Formula to Enter:

Npv(Discount Rate, Cash Flows)

Returns the *Net present value* of an investment that yields a specified cash flow at a given discount rate. Blank cells in a series of payments will be valued at zero. Use blank cells to make the payment periods equal.

Example: Suppose you have borrowed money at 11% per year to purchase a piece of equipment for your business at a price of $10,000. You've determined that the equipment has a useful life of three years and that you will depreciate it with the straight line method. If you're in the 50% tax bracket, your yearly tax savings on this purchase will be one third of half of the purchase price. Enter this cash flow into cell B9 and then copy it into cells C9 and D9. Now enter the formula:

Npv(.11, B9:D9)

The result is $1,282.00

Error Conditions: Npv returns Error if Value is not a number, or if Range contains any cells whose value is not a number.

Formula to Enter:

Regression(Regression Values, Results Table, [Boolean])

Develops an equation that relates dependent variables to one or more independent variables, and provides measurements of the reliability of the resulting coefficients. The result is an equation of the constant b_o, and correlation coefficients b_x, that reproduce the historical data with the smallest error. The resulting equation is:

$$Y = b_o + b_1X_1 + b_2X_2 + b_3X_3 + \ldots$$

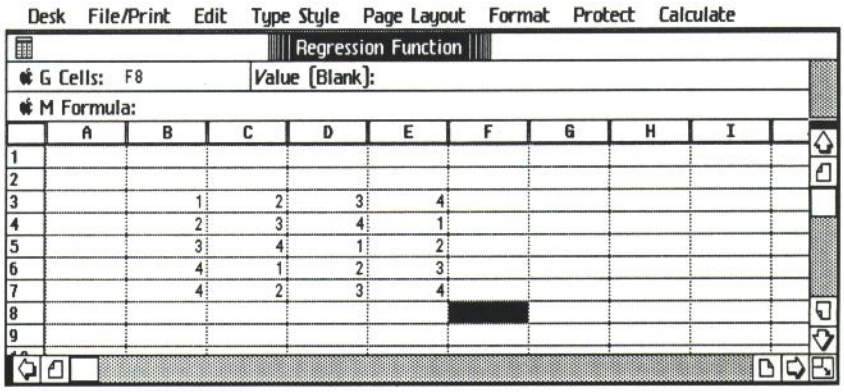
The equation can be used to project results based on the independent variables in X.

Type of Regression Values: Must be numbers entered in a range . Dependent variable Y must be in the first column, and independent variables (X_1, X_2, X_3...) in the following columns. There should be at least two columns in the Regression Range. The first column receives the correlation coefficients sorted from highest to lowest index, so b_n is in row 1, b_{-n} is in row 2, and so on; b_o, the constant term, is in the last row of this column. The second column contains the corresponding standard error for each coefficient except for the last row, which contains the standard error of the estimate (adjacent to the b_o term).

Type of Results Table: Must contain a row for each Regression Value, plus two columns (for the coeffients and their standard errors).

Boolean: The Boolean Argument is optional. If True, computes constant term. If False, doesn't compute constant term. In this case, you will see an Na displayed in the constant position.

Example: In the sample spreadsheet below, the dependent variables are in range B3:B7 and the independent variables are in range C3:E7.



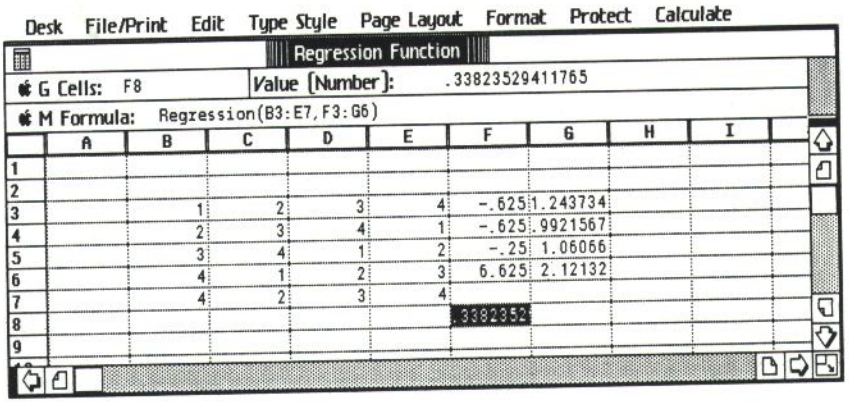
	A	B	C	D	E	F	G	H	I
1									
2									
3		1	2	3	4				
4		2	3	4	1				
5		3	4	1	2				
6		4	1	2	3				
7		4	2	3	4				
8									
9									

To place the results into range F3:G6, enter the regression formula:

Regression(B3:E7, F3:G6)

The function result is the r-square, also called the coefficient of determination, and it displays in the cell where you entered the formula. It measures the percent of the deviation in the dependent variable that explains the independent variable. A perfect r-square is 1, and the poorest is zero.

The meaning of the results that are displayed in the result range are shown and explained below.



	A	B	C	D	E	F	G	H	I
1									
2									
3		1	2	3	4	-.625	1.243734		
4		2	3	4	1	-.625	.9921567		
5		3	4	1	2	-.25	1.06066		
6		4	1	2	3	6.625	2.12132		
7		4	2	3	4				
8						.3382352			
9									

F3:F5 — *Coefficients* ($b_1 ... b_x$). Each one corresponds to the independent variables displayed in the same row.

F6 — *Constant Term* (b_o). If you enter False for the optional boolean argument, Na displays in this position.

G3:G5 — *Standard Errors.* One is computed for, and displayed by, each coefficient. They reflect the precision of the coefficient's measurement. The smaller the standard of error, the greater the precision. Note: there is no standard error for the constant term.

G6 — *Standard Error of Estimate.* Indicates the standard deviation of the dependent variable from the independent variables. You can use it to establish a prediction interval for the dependent variable and the given values of the independent variables.
You can determine other statistics from the above information:

F-test — Measures the goodness of the whole regression including consideration of how much data you have.
$F = (r^2/(k - 1))/((1 - r)/(n - k))$
(In which n equals number of rows and k equals number of independent or dependent variables.)

T-values — You can determine a t-value for each regression coefficient in the regression equation. A t-value is an indicator of the statistical significance of the relationship between the corresponding independent and independent variables. A variable is considered statistically significant if its regression coefficient could not easily have occurred by chance.
$T = X_{coefficient}/X_{standard\ error}$

Error Conditions: Regression returns Error if the range containing the Regression Values contains values other than numbers, or if the Results Table doesn't contain a row for each Regression Value and two columns for the coefficients and standard errors.

Regression returns Na as the result of the function if Results Table contains protected cells. It returns Na as the result of the function and throughout Results Table if the Boolean Argument is not True or False.

Round

Formula to Enter:

Round(Value to Round, [Decimal Position])

Returns the *rounded* value of a number; that is, the Value to Round with some of its rightmost decimal places deleted, and the last remaining place rounded appropriately. If the Decimal Position is not zero, the number entered into the Decimal Position argument indicates the number of decimal places to be displayed in the result. If the Decimal Position Value is omitted or zero, the result will have no decimal fraction.

If the Decimal Position Value is negative, that number of digits to the left of the decimal point is rounded to zero. If it is not a whole number, it is rounded to the nearest whole number.

If the Value to Round is a simple date part, Round returns the number of units (days, months, or years) without the word specifying the type of units.

If the decimal place after the last one to be kept is a 5 followed by zeroes, the number is rounded up if positive, and down if negative.

Type of Value to be Rounded: Number or simple date part.

Value entered for Decimal Position: Whole number. If this argument is omitted, the result will display no decimal places.

Examples:

Round(1.739) = 2

Round(1.8725, 3) = 1.873

Round(−1.8725, 3) = −1.873

Round(1.87251, 3) = 1.873

Round(1250.000, −2) = 1300

Round((5 + 7) years) = 12

Round(1250 days, −2) = 1300

Error Conditions: Round returns Error if the Value to Round is not a number or a simple date part, or if the Value entered for Decimal Position is not a number.

RoundIEEE

Formula to Enter:

RoundIEEE(Value 1, Value 2)

An alternate style of *rounding* that follows the conventions set by the Institute of Electronics and Electrical Engineers.

Same as the Round function *except:* If the decimal place after the last one to be kept is a 5 followed by zeros, the number is rounded in whichever direction makes the last digit an even number.

Examples:

RoundIEEE(1.739) = 2

RoundIEEE(1.8725, 3) = 1.872

RoundIEEE(−1.8725, 3) = −1.872

RoundIEEE(1.87251, 3) = 1.873

RoundIEEE(1250.000, −2) = 1200

RoundIEEE((5 + 7) years) = 12

RoundIEEE(1250 months, −2) = 1200

Search

Formula to Enter:

Search(Search Range, Boolean Argument, [Initial Result, Formula for Recomputing Result])

Search can be thought of as a procedure that executes once for each cell in the Search Range. Search examines each cell to see if it meets the criteria specified by the logical formula in the Boolean Argument.

When the optional arguments are included, the first specifies an initial value for the result of the function and the second specifies the result of the function when one of the items being searched for is found.

Search has two constants peculiar to it: *Cell* and *Result*. Cell refers to the value of the cell being examined. Result refers to the current result of Search.

Search functions cannot be nested.

Values in Search Range: Can be any type.

Boolean Argument: Must be a logical formula.

Initial Result Value: Must be a number. Its use is optional.

Formula for Recomputing Result: Must be a formula. Its use is optional, but it must be used if the other optional argument is being applied.

Examples:

Search(A1:A10, Cell = 10)

Returns the number of cells in A1:10 that are equal to 10.

Search(A1:A10, Cell = 10, 0, Result + 1).

This example is identical to Search(A1:A10, Cell = 10).

Search(A1:A10, Cell >= 10 And Cell < 100)

Returns the number of cells in the range A1:A10 that have 2-digit values.

Search(A1:A100, True, 20, Result + 3)

Search starts with a result of 20 and increases it by 3 for each nonblank cell in the range A1:A100. That is, for each nonblank cell in the range the result is successively 20, 23, 26, 29, and so forth until no non-blank cells are left.

Search(A1:A10, True, 0, Result + Cell^2)

This example returns the *Sum of the Squares* of the numbers in the range A1:A10. It is the same as the SumSqr function, except that any labels in the range result in Error.

Search(A1:A10, True, 0, Result + If(Cell > 10000, Cell*1.10, Cell)

In this example, the values in A1:A10 are sales figures for this year in ten different categories. The example assumes that for any category in which the total is greater than $10,000, sales next year will be 10% higher. The result of the function is the sum of the sales figures in the range, with those over $10,000 increased by 10%.

Search(A1:A10, Cell > 1000, True, True)

This example returns True if the range A1:A10 contains any value greater than 1000; otherwise, it returns Na.

You can use Search with the Index funciton and the constant *Cell*. Suppose you want to find the total 1971 sales for everyone listed in the example below.

Desk File/Print Edit Type Style Page Layout Format Protect Calculate

Sales-'70 to '72

G Cells: F4 | Value (Number): 114000

M Formula: search(B4:B9, cell=1971, 0, result+index(cell, 2, 0))

	A	B	C	D	E	F	G	H	I
1	Salesperson	Year	Area	Sales	Totals:				
2					1970	1971	1972		
3									
4	Sinclair, L.	1970	North	$ 24,000		114000			
5	Juarez, C.	1972	Central	$ 6,700					
6	Mandotti, G.	1971	East	$ 52,000					
7	Lewis, J.	1972	Central	$ 89,000					
8	Aaron, E.	1970	Central	$ 4,900					
9	Lu, C.	1971	East	$ 62,000					
10									
11									

The formula is:

Search(B4:B9, Cell = 1971, 0, Result + Index(Cell, 2, 0))

LisaCalc searches through the range, and for every value equal to 1971, adds the value located two columns over and in the same row, to a total.

Error Conditions: Search returns Error if a formula used with the function is incorrect, such as a formula containing incompatible operators and operands. Search returns Na if the logical function is never true, that is, if Search never finds anything.

Sign

Formula to Enter:

Sign(Value)

Computes the *sign* of a value. It is used in statistical computations or with any formulas that require the sign of the value in the computation.

Type of Value: Numbers or dates.

Examples:

Returns −1 if the value is negative.

Returns 0 if the value is zero.

Returns +1 if the value is positive.

Error Conditions: Sign returns Error if Value isn't a number or date part.

sin (Sine)

Formula to Enter:

sin(Value)

Returns the *sine* of the Value.

Type of Value: Number, in radians.

Example: To find the sine of .5235988, enter *sin(.5235988)*. The result is .5, or the sine of 30°.

Error Conditions: Sin returns Error if Value is not a number.

sinH (Hyperbolic Sine)

Formula to Enter:

sinH(Value)

Returns the *hyperbolic* value of the *sine* of a number.

Type of Value: Number.

Example: A structural engineer might want to find the hyperbolic value of an equation in order to determine the stress loads on a particular structure. The formula might be:

sinH(1.25)

The result is 1.6019190.

Error Conditions: Hyperbolic sine returns Error if Value is not a number.

Sqrt (Square Root)

Formula to Enter:

Sqrt(Value)

Returns the positive *square root* of Value.

Type of Value: Positive number.

Example: Sqrt(13.69) = 3.7

Error Conditions: Sqrt returns Error if Value is negative or not a number.

StDev (Standard Deviation)

Formula to Enter:

StDev(List)

Computes the *standard deviation*, a measure of dispersion around the mean of the accumulated data. Uses the formula:

$$S - \sqrt{\frac{\sum(x-X)2}{n-1}}$$

You can find the *standard variance* by squaring the standard deviation.

You can find the *mean standard deviation* for the population by adding the *Average* function into the formula. For example:

StDev(A1:A10, B3:F4, Average(A1:A10,B3:F4)).

Type of Values in List: Numbers.

Example: Suppose you want to find the dispersion from the average score in a group of college students' test scores. The scores range from 15 to 98. If you enter the scores in the range of cells B10:G80, the formula is *StDev(B10:G80).*

Error Conditions: Returns Error if Values in the List are not numbers.

Sum

Formula to Enter:

Sum(List)

Returns the *sum* of the values in List. Blank cells and labels are treated as zero. If logical values are included in the List, *True* is valued as +1, and *False* is valued as zero.

Type of Values in List: Any type of values except dates. (Date parts are okay.) Values must be compatible.

Examples:

Sum(1.45, True, "Balance", −.007) = 2.443

Sum(B1:B5) = the sum of the values in each of the 5 cells

Sum(3 months, 2 years, 15 months) = 2 years, 18 months

Error Conditions: Sum returns Error if the List contains a date or Error, or if incompatible values are used together in the List (such as numbers and date parts). Note: text in a cell will be valued at zero.

SumSqr (Sum of the Squares)

Formula to Enter:

SumSqr(List)

Returns the *sum of the squares* of the value of the items in a List. Blank cells and labels are treated as zero.

Type of List: Numbers, logical values, and labels.

Examples:

SumSqr(1, 2, 3, 4, 5, 6, 7, 8, 9, 10) = 385

SumSqr(.1, .2, .3, .4, .5, .6, .7, .8, .9, 1) = 3.85

SumSqr(1, 1, 2, 3, 5, 8, 13, 21, 34, 55) = 4895

Error Conditions: SumSqr returns Error if List contains dates or date parts, or if any cell in the List has the value Error.

tan (Tangent)

Formula to Enter:

tan(Value)

Returns the *tangent* of Value.

Type of Value: Number, in radians.

Example: To find the tangent of 1.04, enter *tan(1.04)*. The result is 1.73205, or the tangent of 60°.

Error Conditions: Tan returns Error if Value is not a number. If Value is equal to (4n + 1)*Pi/2, where n is a whole number, positive or negative, then Tan returns either Infinity or a very large positive or negative number.

tanH (Hyperbolic Tangent)

Formula to Enter:

tanH(Value)

Returns the *hyperbolic* value of the *tangent*.

Type of Value: Number.

Error Condition: Hyperbolic tangent returns Error if Value is not a number.

Xrr
(Modified Internal Rate of Return)

Formula to Enter:

Xrr(Range of Payments, −Return Rate, +Return Rate, [Boolean Argument])

Computes the *modified internal rate of return*. *Xrr* is the same as the Irr function (Internal Rate of Return) except you can have more than one negative cash flow, and separate rates can be provided for the positive and negative cash flows.

You can enter the optional Boolean Argument (True or False) to determine which way to take the payments. Omitting the Boolean gives the same result as entering True. True takes the negative payments to the present and the positive payments to the future. False does the opposite.

Type of Range of Payments: Number. This Range contains the cash flows.

−Return Rate: The discount rate for the negative cash flows.

+Return Rate: The discount rate for the positive cash flows.

Example: Suppose you are offered a five year investment that requires an initial $30,000. The payments over the four years are +$2,000 the second year, −$3,000 the third year, +$8,000 the fourth year, and a sell-out for $50,000 in the fifth year. Provided the discount rate for the cash flows is 15% for negative and 8% for positive cash flows, and you bring the negative cash flows to the present, what will be the internal rate of return on this investment?

To find out, enter these cash flows into range G5:G9, −30000, +2000, −3000, +8000, +50000. Now enter the formula:

Xrr(G5:G9,.15,.08)

The result is .159.

Error Condition: Xrr returns Error if the Range of Payments contains values other than numbers, or if Boolean contains anything but True or False.

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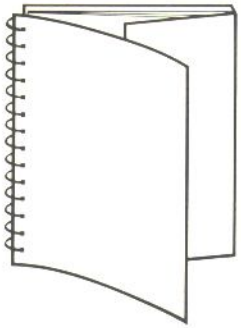

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LisaCalc

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